

An Annotated Bibliography of Phenomenographic Research: Selected Publications to 1997

Christine Bruce, Helmut Klaus, Ian Stoodley

(Compiled from [*Phenomenographic Research: An Annotated Bibliography \(Third Edition\)*](#) and [*1997 Supplement*](#).)

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PREFACES AND INTRODUCTORY NOTES

Preface to third edition

We are reminded frequently by phenomenographic theorists such as Ference Marton and Lennart Svensson that the object of phenomenographic research is human experience as it is remembered from a second-order perspective. The distinctive relational nature of phenomenography in which the subject and the object of the research are investigated for their relationships in a particular context and the search for qualitative variations in these relations suggest strengths for a research methodology which can no longer be denied in educational and social science research. Additionally, the capacity for phenomenographic studies to adopt a supra-individual orientation in the empirical investigation of human experience is an attraction for this methodology.

Some people become frustrated with phenomenographic investigations because they focus on answering What? questions and not How? or Why? types. This is because they aren't satisfied with the revelation of qualitative variations in people's experience of selected phenomena. Other researchers are contented to use the revealed differences as a basis for the consideration of pedagogical implications of these results. Whether the outcomes of the phenomenographic research are seen as the endpoint of the research or as a means to another end is really not the issue for the phenomenographic study has usually yielded valuable, rich results which have offered an alternative description of people's experience of the phenomenon. The power of phenomenography resides in its revelation of the variation in the experience.

The annotations in this publication are intended to offer prospective qualitative researchers and/or post-graduate research students a helping hand to enter the sometimes challenging research conversation that is centred around phenomenography. Please use this volume as diversely as your needs are to maximise its contents and to improve your experience of this distinctive approach to research.

Good luck!

Rod Gerber
September, 1995

Introduction to third edition

The Database of Phenomenographic Research has been compiled over a period of three years out of resources identified and held in the Centre of Applied Environmental and Social Education Research at the Queensland University of Technology. The database represents a wide range of books, journal articles, conference papers and research reports in the field of phenomenographic research from its development in the late 1970s and early 1980s through to the present.

Coverage of the database is not comprehensive. However it does include core materials of significance in the development of phenomenographic research and what has come to be called phenomenographic pedagogy. The database also includes a selection of materials on phenomenology and interviewing techniques which may be of interest to the phenomenographic researcher. Papers in languages other than English are not included. To indicate the directions which the early phenomenographic researchers have taken, more recent papers by Ference Marton, Lennart Svensson, Roger Säljö and Lars Dahlgren also appear.

The content of the database indicates clearly that phenomenography has primarily been a tool for educational research. Its roots are Swedish (University of Gothenburg), and it has developed a strong following in Britain and Australia. There is very little material emanating from the United States.

This third edition contains over one hundred and fifty citations, almost all of which are annotated to provide a perspective of their place in this developing research paradigm. Included in this edition are a chronological listing of papers emanating from the phenomenographic approach and a selected index. It should be noted that the chronological listing is of papers closely related to phenomenography only; extraneous material on interviewing for example has not been included.

This third edition of Phenomenographic Research: an annotated bibliography includes the contents of the database as at July 1995.

Christine Bruce
July 1995

Preface to 1997 supplement

This listing continues and supplements the third edition of the bibliography Phenomenographic Research by Christine Bruce and Rod Gerber. It continues this bibliography in recording papers and publications that have been published since 1995; it supplements this bibliography by including references to pre-1995 publications that were not reported yet. Categories of sources referred to are books, journal articles and conference papers. References have been annotated in those instances where abstracts were available.

Like its predecessors, this listing, containing more than one hundred citations, does not claim by any means to be comprehensive and it includes only material written in English. However, it has been attempted to cover material of significance in the development of phenomenographic research and pedagogy.

The database source file of this supplement in EndNote 2 format is available free of charge.

Editorial work on this fourth edition of Phenomenographic Research: an annotated bibliography was finalised in January 1998.

The inclined reader may find online publications, dissertation abstracts and pointers to individuals maintaining listings of their own publications at the documents edited by [Biörn Hasselgren](#).

Brisbane, January 1998
Helmut Klaus
Christine Bruce

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ALPHABETICAL LISTING

Aberg-Bengtsson, L. and Ottosson, T. (1995) Cognitive processes in the developing of understanding of graphically represented quantitative information. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

There is a limited amount of research concerning students' understanding of the information in graphics. Reading off of values or perceiving the most relevant aspects of commonly used graphs and charts does not appear to be a problem for even very young children at early primary levels. A previous project of ours focused on differences in ways of conceiving graphs, charts and cartograms. The present study primarily aims at revealing how students develop a basic understanding of graphs and charts. A second aim is to further investigate students' conceptions of commonly used graphic representations. Data for the main study involve twelve pupils 7-10 years old while they were learning and constructing graphics. The children worked one pair at a time, with the initial 'lessons' being practical ones. The work was divided into three phases and lasted over a period of approximately six weeks for each group. All work sessions, with a few exceptions, were video-taped. The video recordings have been transcribed and the data analysed partly by the method used in phenomenographic research. The preliminary results show that the students express different ways of understanding both initially and after having learnt to construct and read a number of graphs and charts. (Author's abstract).

Alexandersson, C. (1981) *Amadeo Giorgi's Empirical Phenomenology*. Department of Education, University of Goteborg, 1981:03.

This report represents one particular line of thought within the phenomenological framework that can serve as a theoretical foundation for an empirical method . It outlines major phenomenological concepts such as subject - world relations, description, reduction, intentionality and essences, all of which are also important to phenomenography.

Allen, J. (1995) *The nature of significant experience: a phenomenographic, phenomenological and heuristic study of descriptions of significant experiences*. Unpublished MEd, LaTrobe University, Bundoora, Vic.

The aim of this research was to understand the nature of significant experience. Three final year occupational therapy students completed a series of indepth interviews in which they described and reflected upon significant experiences in their lives, and in particular, significant experiences arising out of a series of experiential arts workshops in which they participated as a part of their undergraduate studies. The author was the facilitator of this unit. The data included the full transcripts of all nine interviews with the participants as well as the author's self reflected data which included narrative text and visual images. This data described the author's process as researcher and facilitator of the expressive arts course, as well as reflections on the research process. A multi method approach was developed to the data analysis, using phenomenographic, phenomenological and heuristic methods. Prior to the data analysis the author read extensively to clarify the epistemological foundations of this study. However, a literature review was completed following the data analysis, to ensure the phenomenological rigour of the analysis. The findings of this research indicated that there are seven fundamental aspects to significant experience. They are the self, others, knowing, change, decisions, the event, and time. In the discussion and results section of this thesis each aspect of significant experience has been

described in the form of a depiction, which was derived from the analysis of the self reflected data, and a statement of essences derived from the analysis of the participants' data. These statements of essences and depictions have been discussed with reference to phenomenological philosophy and research in psychology and education as well as returning to examples from the transcripts and self reflected data. The last section of the results and discussion comprises a summary statement in the form of a description of an exemplary significant experience. The results of the analysis point to ways in which experiential teaching and learning might be facilitated, through the intentional use of phenomenological and heuristic methods within the lived experience of significant learning.

Anderberg, E. (1996) *How does Understanding occur? An Empirical Study of Students' Thinking in Relation to Use of Language when solving a Problem*. European Conference on Educational Research.

In considering students' thinking, the phenomenographic tradition has paid considerable attention to concepts of meaning and activity. However, this tradition has not explicitly examined the relation of semantic expression and experience meaning to the processes of understanding and learning. The aim of the present study is to examine the character of the links between semantic expression and the thinking that occurs behind. In order to understand these relationships more fully, an empirical study was carried out. This study explores both students' reflective thinking, and the relation between students' expressions and the content of their thought while engaging in reflective thinking. Twenty-seven students from two institutes of higher education, a college of health and science and a college of education, participated. Qualitative interviews were the instrument used both to stimulate students' reflective thinking about their expressed conceptions of a particular problem and to document their processes of conceptualisation. Contextual analysis was one method used to examine this data. The results of the analysis are presented in three related descriptive categories. The categories represent three different characteristics of relationships between word used and conceptions behind and different development of these relationships appeared. Finally, conclusions are drawn and are discussed in relation to research on understanding and learning and to major traditions in the philosophy of language. The study give insight into the thinking activity and its relationship to different characters of semantic meaning and intentional meaning.

Backe, M., Larsson, K., & Fridlund, B. (1996) Patients' conceptions of their life situation within the first week after a stroke event: a qualitative analysis. *Intensive and Critical Care Nursing*, 12(5): 285-294.

The aim of this study was to find out how stroke patients conceived their life situation within the first week of the acute care phase as seen from the nurses' viewpoint. Six patients were interviewed within 3 weeks from their first stroke, using questions based on a holistic philosophy and analysed with the phenomenographic approach. Two main categories emerged from the results: the feeling of unreality and the awareness of a changed role in life, together with six subcategories; feeling of a changed perception of the body; feeling of being confused; loss of capability; awareness of confined life space; the importance of support and encouragement; and the will to look for new opportunities. The study concludes that the body change resulting from a stroke leads to both physical and psychological trauma, in which the psychological crisis can be very deep and best described as a personal catastrophe. The patient's capability to receive and understand information becomes blocked, which influences both the nurse and the patient's next of kin with regard to their care of the patient. Conversations with the patient must be frequent so that the acute care can be evaluated and agreement reached between the patient's wishes and the nurses' objectives. The results indicate the significance of intervention programmes based on crisis theory within the first week of a stroke event.

Ballantyne, R. (in press) Interpreters' conceptions of Australian Aboriginal culture and heritage: implications for interpretive practice. *Journal of Environmental Education*.

Fourteen interpreters (including eight Aboriginals) with experience in the design and/or management of Aboriginal interpretation programmes were interviewed regarding their understanding of Aboriginal culture and heritage and their views on its interpretation. Two different ways of conceiving Aboriginal culture are identified, with implications for the aims, content and strategies of interpretation programmes. If Aboriginal culture is understood as contemporary and evolving rather than as a thing of the past, interpreters need to begin to address post- contact issues, including both the positive role played by Aboriginals in Australian society and the past injustices committed against Aboriginal people. The importance of adopting a consultative approach under the control of the local Aboriginal community is stressed and the use of face to face interpretive experiences recommended. (Author's abstract).

Ballantyne, R. and Bruce, C. (eds.)(1994) *Phenomenography: Philosophy and Practice*. Proceedings. Queensland University of Technology, Brisbane, Australia, 7-9 November 1994.

Previous gatherings in Australia revolving around phenomenography include the Marysville and Warburton symposia (see Bowden 1986 and 1994). This conference was developed around the twin needs of pushing forward theoretical understandings of phenomenography and providing a forum for postgraduate students and more experienced researchers to dialogue. The contents of the proceedings reflect these intentions. In addition to the papers, the volume includes a composite reference list drawing together in alphabetical order all the references from the papers in the proceedings.

Ballantyne, R. and Gerber, R. (1994) Managerial Conceptions of Environmental Responsibility. *The Environmentalist*, 14(1): 47-56.

In order for business and industry to exercise environmental responsibility in their daily operations and practices, it is necessary for company personnel at all levels to be aware of and committed to the implementation of environmental policies. This study used a phenomenographic approach to explore different ways in which company executives understand and apply environmental responsibility in their managerial roles. Ten senior managers located in three large industrial companies were interviewed and encouraged to express their own interpretation of the phenomenon of environmental responsibility. Four distinct conceptions emerged from the data which differ according to the preferred methods of expressing environmental responsibility within a business setting and the perceived motivations underlying corporate environmental action. (Author's abstract).

Ballantyne, R.R. and Packer, J.M. (in press) Teaching and learning in environmental education: developing environmental conceptions. *Journal of Environmental Education*, 26(4).

Attempts to define the nature and scope of environmental education invariably promote, as its ultimate aim, the development of responsible environmental behaviour. It is generally recognised that in order to achieve this outcome, environmental educators must provide students with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment. Although the majority of environmental educators support these statements, in practice the affective dimension has become pre- eminent and the teaching of attitudes and values emphasised at the expense of environmental knowledge. This paper explores reasons for the traditional imbalance between the importance placed on environmental knowledge and attitudes/values in environmental education; examines the limitations of a values education approach in achieving the aims of environmental education; and proposes the application of constructivist principles of learning as a means of overcoming such limitations and integrating environmental knowledge, attitudes/values and behavioural orientations. Such an approach, it is contended, will improve the effectiveness of environmental education in achieving its state goal of promoting environmental literacy and environmentally responsible behaviour.

Beaty, E., Dall'Alba, G., & Marton, F. (1997) The personal experience of learning in higher education: changing views and enduring perspectives. In P. Sutherland (ed.) *Adult Learning: a Reader*. London, Kogan Page.

Biggs, J. B. (1996) Approaches to learning. In A. C. Tuijnman (ed.) *International Encyclopedia of Adult Education and Training*. Oxford UK, Pergamon: 381-385.

Approaches to learning refer to the ways and strategies in which students go about their learning tasks, thereby affecting the nature of the learning outcome. 'Approach to learning' is often used interchangeably with 'learning style' but these terms are quite distinct. This general area of student learning has been investigated using four distinct frameworks, deriving from personality, information- processing, phenomenographic theories and systems theories. There are thus four models relating to students' approaches to learning, each variously emphasising the different components in the total teaching-learning context: the person, the teaching context, the learning processes used, and the learning outcome. The nature and measurement of approach to learning thus depends on which of these aspects the model addresses. This entry addresses each model in turn, then examines the relationship between approach and outcome.

Beatty, E., Dall'Alba, G. and Marton, F. (1990) *Conceptions of Academic Learning*. Occasional Paper 90.4, ERADU, RMIT.

Continuing the phenomenographic explorations of conceptions of learning. (Earlier work for example, by Marton and Säljö and Pramling). Description of analysis techniques reflects strongly the language of phenomenology.

Beatty, E.M. (1987) Understanding concepts in social science: towards an effective evaluation strategy. *Instructional Science*, 15: 341-359.

Describes Beatty's study into university students' conceptions of capitalism and ways in which social science subjects were changed in order to encourage the adoption of appropriate conceptions. Concentrates on subject evaluation on the basis of changed conceptions on the part of learners.

Bers, T.H. (1989) The popularity and problems of focus-group research. *College and University*, 64: 260-8.

Focus group methods have been considered as a data gathering strategy in phenomenographic research.

Biggs, J.B. (1996). Approaches to Learning. in A. C. Tuijnman. (Ed.) *International Encyclopedia of Adult Education and Training*. Oxford UK, Pergamon: 381-385.

Approaches to learning refer to the ways and strategies in which students go about their learning tasks, thereby affecting the nature of the learning outcome. 'Approach to learning' is often used interchangeably with 'learning style' but these terms are quite distinct. This general area of student learning has been investigated using four distinct frameworks, deriving from personality, information- processing, phenomenographic theories and systems theories. There are thus four models relating to students' approaches to learning, each variously emphasising the different components in the total teaching-learning context: the person, the teaching context, the learning processes used, and the learning outcome. The nature and measurement of approach to learning thus depends on which of these aspects the model addresses. This entry addresses each model in turn, then examines the relationship between approach and outcome.

Biggs, J.B. (1986) Enhancing learning skills: the role of metacognition. In J. Bowden (ed.) *Student Learning: Research Into Practice - the Marysville Symposium*. CSHE, University of Melbourne.

Biggs critiques the results of phenomenographic research with particular reference to the notion of deep and surface learning strategies, and proposes a modified model. Moves away from the notion of describing the students' perceptual world through description of data to looking for a working model for thinking about student learning.

Bock, H.K. (1986) Phenomenography: orthodoxy and innovation or innovation and orthodoxy. In J. Bowden (ed.) *Student Learning: Research Into Practice - the Marysville Symposium*. CSHE, University of Melbourne.

An extended critique of phenomenography, and its contribution to educational research, and the practice of teaching study and learning skills.

Booth, S. (1997) On phenomenography, learning and teaching. *Higher Education Research & Development*, 16(2): 135-158.

Phenomenographic research has tackled questions concerning the variation in ways in which people experience the phenomena they meet in the world around them. The empirical work directly addressing educational issues has to a large extent focussed on describing qualitatively different ways in which particular sorts of students understand a phenomenon, or experience some aspects of the world, which is central to their education, and setting the results into the educational context of interest. Learning is viewed as being a change in the ways in which one is capable of experiencing some aspects of the world and other research has been linked to attempts to bring about such change by utilising certain approaches to teaching. This article will outline principles for teaching based, on the one hand, on the body of empirical phenomenographic research, and, on the other hand, on an emerging picture of human awareness. The principles will first be drawn, explicated with the help of a number of empirical studies in the phenomenographic tradition, and then the whole will be illustrated through an example of a study of learning and teaching programming at university.

Booth, S. (1994) On phenomenography, learning and teaching. In R. Ballantyne and C. Bruce (eds.) *Phenomenography: Philosophy and Practice*. Proceedings. QUT, Australia, pp. 3-6.

This is an outline of the author's paper which focuses on principles for teaching based on the body of empirical phenomenographic research and the emerging picture of the nature of human awareness.

Booth, S. (1993) Computer-assisted analysis in qualitative research. *Computers in Human Behavior*, 9(2-3): 203-211.

Developed a computer program for assisting the researcher in handling qualitative data and understanding it, particularly with phenomenographic principles in mind. Thus, the researcher can select and store extracts of documents and look at them in the contexts of both the original document and the sets of potentially related extracts. The program takes care of storage, thematization, extensive note-making, and flexible cross-referencing. The program enables the researcher to analyze individual documents by selecting text extracts, to assign themes to them, to sort and shuffle them according to desired criteria, to review them in both contexts, and to produce text reports. While the program has been developed with a particular research tradition in mind, phenomenography, it is equally applicable for various other qualitative research approaches.

Booth, S. (1990a) *Conceptions of programming: a study into learning to program*. Molndal, Goteborg Univ., Inst. of Education.

This paper reports the results of a phenomenographic study which focused on identifying and describing the conceptions of programming and related phenomena of about 120 computer science and computer engineering students learning to program. The report begins by tracing developments in the students' conceptions of programming and its parts, and then looks at the development of their understanding of programming concepts and techniques. A group of undergraduate

students at the University of Gothenburg (Sweden) were followed during their 6 months of study, during which time they received instruction in two programming languages--SML (Standard Meta-Language) and Pascal. The students were interviewed six times during the study, and the results of the study are based on thorough analyses of the first and sixth interviews, plus interviews with a group of 12 second year students who had completed a further course of programming. Data from "Programmers at Work" (Lammers, 1986), a collection of interviews with successful professional programmers, were used to broaden the base of the study. Analyses identified students' conceptions of programming as an activity, a problem to be solved, and an end product; computers as tools, facilitators, simple machines, and universal engine conceptions; and programming languages as codes, utilities, a means of communication, and a means of expression. The report concludes with discussions of complexity in the conceptions of programming, learning to program, and further research to be conducted as a continuation of this study. Descriptions of the programming languages and an outline of the interviews are appended.

Booth, S. (1990b) *Students' conceptions of programming, programming languages and programming constructs*. Occasional Paper 90.5, ERADU, RMIT.

Reports a phenomenographic study conducted at Chalmers University of Technology of students studying Computer programming. Part of a larger project into interactive learning environments led by Ference Marton. In discussing her research technique Shirley Booth writes about uncover(ing) the students understanding of the essence of programming languages.. This is symptomatic of increasing leanings towards phenomenological theory in phenomenographic research.

Bowden, J. (1994a) Phenomenographic research: a personal experience. In J. Bowden and E. Walsh (eds.) *Phenomenographic Research: Variations in Method*. EQARD, RMIT.

Bowden s approach to phenomenographic research is distinctive and well outlined in this paper. In particular he advocates the use of a group process for analysis, and questions the capacity of individual researchers to take the data as far as possible . Concludes with some reflections on why phenomenographic research should be undertaken.

Bowden, J.A. (1994b) The nature of phenomenographic research. In J. Bowden and E. Walsh (eds.) *Phenomenographic Research: Variations in Method*. EQARD, RMIT.

In this chapter Bowden raises a range of issues in relation to the phenomenographic approach, such as: Do variations in practice matter? (p3), Are there methodological implications in adopting a pure or developmental stance? (p3), The importance of a coherent methodology (p7), Where does phenomenographic research begin and end? (p12), The need for consistency of intention in the use of the term conception (p14).

Bowden, J.A. (1991) *Quality in Higher Education: Philosophy and Rationale of the RMIT Developmental Approach*. Occasional Paper 91.2, ERADU, RMIT.

Bowden, J.A., Dall Alba, G. and Walsh, E. (1991) Teaching implications of phenomenographic studies of physics students understanding of displacement, velocity and acceleration. *Research and Development* Vol 13. Papers presented at the 16th HERDSA conference held at Griffith University, Brisbane 6th -9th July 1990, B. Ross (ed.) HERDSA, Sydney.

Reports a study into physics concepts such as acceleration. Includes a discussion of implications for teaching.

Bowden, J.A. (1990) *Curriculum Development for Conceptual Change Learning: a Phenomenographic Pedagogy*. Occasional Paper 90.3. ERADU: RMIT.

This paper addresses the relation between educational research and educational practice... The theoretical base underlying this way of understanding processes of conceptual change learning will be referred to as phenomenographic pedagogy.... phenomenographic pedagogy is concerned with ways of facilitating conceptual change by the learner in context. (p1)

Bowden, J. (ed.) (1989) *Student Learning: Research Into Practice, the Marysville Symposium*. Centre for the Study of Higher Education, University of Melbourne.

A series of invited papers presented at the Marysville Symposium in response to the growing field of educational research using phenomenography; and in particular responding to the distinctions drawn between deep and surface learning arising from Säljö and Marton s research into student learning, and other work reported in *The Experience of Learning* (Marton, Hounsell and Entwistle, 1984). A strong Australian flavour is represented with contributions from Zuber-Skerritt, Eizenberg, Prosser, Biggs, Bowden, Moses and Hegarty Hazel. Ference Marton offers a paper entitled *Some Reflections on the Improvement of Learning* .

Bowden, J. (1988) Achieving change in teaching practices. In P. Ramsden (ed.) *Improving Learning: New Perspectives*. Kogan Page, London.

John Bowden describes workshops designed to help change teachers conceptions of teaching . The workshops aim to encourage teachers to identify important concepts which students need to learn, the possible alternative conceptions they might hold, and strategies for helping students change their conceptions, diagnosing students difficulties etc.

Bowden, J.A. (1986) Educational development and phenomenography. In J. Bowden (ed.) *Student Learning: Research into Practice, the Marysville Symposium*. CSHE, University of Melbourne.

Introduction to the monograph, describing the background to the meeting, the participants and what took place there. Focuses on the appeal of phenomenography to teachers and comments on the differing perspectives on phenomenographic research taken by teachers and researchers. The notion of the teacher-researcher does not appear to be present.

Bowden, J.A. and Walsh, E. (eds.) (1994) *Phenomenographic Research: Variations in Method*, The Warburton Symposium. EQARD, RMIT.

Both a study of articles and reports published about phenomenographic research and less formal communications at conferences and educational meetings make it clear that there are considerable variations in the methods used by different phenomenographic researchers and even by the same researcher in several investigations. In order to consider those variations in method carefully, the Warburton Symposium was arranged during Winter, 1991. (from the preface p. vii). Includes chapters on the nature of phenomenographic research (Bowden, Trigwell), analysis (Walsh), personal accounts of using the approach (Bowden, Prosser, Dall Alba), and a chapter on the structure of awareness (Marton).

Bowden, J. and Dall Alba, G. (1990) *Phenomenographic Studies of Understanding In Physics: Displacement, Velocity and Frames of Reference*. Occasional Paper 90.6, ERADU, RMIT.

Study into final year high school and undergraduate students understanding of kinematics concepts.

Brewer, L. (1995) Families talking: what can they tell us about best practice in the transition to school? Communicating 'now we're really talking': 12th State Conference of the Australian Early Intervention Association (NSW Chapter) Inc, 3rd - 5th August 1995, Vineyard Resort; Pokolbin, NSW, Chatswood NSW: Australian Early Intervention Association. New South Wales Chapter.

In this paper a recent study of families with children with special needs is discussed. These families all had children who commenced school in 1994. All children were in integrated kindergarten classrooms. The focus of discussion is one aspect of a phenomenographic analysis of interview data. Parents' perceptions of problems in the transition to school is related to guidelines for best practice in transition.

Brookfield, S. (1994) Tales from the dark side: a phenomenography of adult critical reflection. *International Journal of Lifelong Education*, 13(3): 203-216.

Five themes emerged from critical reflection in journals, conversations, autobiographies of 311 adult educators: impostorship (unworthiness to participate in critical thought), cultural suicide (risk of exclusion), lost innocence (from certainty to multiplistic reasoning), roadrunning (incremental struggles with new modes of thought), and community (support for those engaged in the critical process).

Bruce, C. S. (1998a (in press)) *The experience of information literacy : toward a holistic model*.

Bruce, C. S. (1998b (in press)) The phenomenon of information literacy. *Higher Education Research and Development*.

Bruce, C. S. (1998c (in press)) A relational approach to information literacy. *New Review of Library and Information Research*.

Bruce, C. S. (1997) *The seven faces of information literacy*. Adelaide, Auslib Press.

Bruce, C. S. (1996) From neophyte to expert: counting on reflection to facilitate complex conceptions of the literature review. In O. Zuber-Skerritt (ed.) *Frameworks for Postgraduate Education*. Lismore, NSW, Southern Cross University Press: 239-253.

There is a growing body of researchers and teachers in universities who support the view that learning involves conceiving of aspects of the world in new ways. This view of learning is appropriate in the arena of postgraduate study and supervision, as well as in the undergraduate context. The literature review is one facet of the research process for which we have some insight into the varying conceptions of neophyte researchers. In this chapter, I review these conceptions and suggest strategies which will help postgraduate students to recognise the range of conceptions and adopt those which are most appropriate to their work. A reflective model for reviewing the literature is proposed as a useful strategy for facilitating the adoption of appropriate conceptions. The model is supplemented with other strategies, all of which have been successfully used with groups of postgraduate from a range of disciplines. Finally, a series of questions that individual supervisors, or supervisory teams, should consider in relation to supervising the literature review process is put forward.

Bruce, C. S. (1995) Information Literacy: How do University Educators understand this Phenomenon? Second National Information Literacy Conference, Adelaide, Adelaide: University of South Australia. Library.

This paper reports preliminary results of a study into varying ways in which university educators conceive of information literacy.

Bruce, C. (1994a) Reflections on the experience of the phenomenographic interview. In R. Ballantyne and C. Bruce (eds.) *Phenomenography: Philosophy and Practice*. Proceedings. QUT, Brisbane, pp. 47-56.

The interview is one of the most widely used strategies for data gathering in phenomenographic research. This paper, based on the author's reflections on her own experience of conducting phenomenographic interviews, argues that, although the phenomenographic interview belongs to the family of qualitative research interviews, it has distinctive characteristics which set it apart. The paper also examines the following questions: Why use the interview as a data gathering strategy? What are the advantages and problems associated with different interview settings? and How can we validate the interview process? (Author's abstract).

Bruce, C. (1994b) Research students' early experiences of the dissertation literature review. *Studies in Higher Education*, 19(2): 217-229.

The phenomenon of a dissertation literature review is explored from a second-order perspective. Written responses from forty-one neophyte research scholars from various disciplines in an Australian university were gathered in response to questions about the literature review. A phenomenographic analysis identified six conceptions or ways of experiencing literature reviews. The conceptions represent different relations between student researchers and the literature. The range of conceptions suggests that supervisors and other teachers interested in the literature review process need to accept literature reviews as a problem area for students and develop strategies to help them. (Adapted from author's abstract).

Bruce, C. (1992a) *Research students' conceptions of a literature review*. Masters Thesis, Faculty of Education, Queensland University of Technology, Brisbane.

Bruce, C.S. (1992b) In search of research students' conceptions of a literature review. *Research and Development in Higher Education*, volume 15, Proceedings of the HERDSA Conference, July 1992, Churchill, Victoria, pp. 570-577.

A description of the analysis technique used in discovering research students' conceptions of a literature review, and the research outcomes.

Bruce, C. S., & Brameld, G. H. (1998 (in press)) Encouraging student-directed research and critical thinking. In O. Zuber-Skerritt (ed.) *Supervising Postgraduate Students of NESB Backgrounds*. Milton Keynes, Open University Press.

Bruce, C. S., & Gerber, R. (1995) Towards university lecturers' conceptions of student learning. *Higher Education*, 29: 443-458.

A range of studies conducted since the late 1970s have sought to describe students' conceptions of learning, and more recently, teachers' conceptions of teaching. These studies, using what has come to be known as the phenomenographic approach, have identified conceptions of teaching, and conceptions of learning which have had a significant impact on the teaching-learning culture of higher education institutions in many parts of the world. The study reported here

contributes to our understanding of student learning, describing it from the viewpoint of lecturers from a range of disciplines. From the viewpoint of these lecturers student learning was seen variously as: acquiring and applying it; the development of thinking skills and the ability to reason; developing the competencies of beginning professionals; changing personal attitudes, beliefs or behaviours in responding to different phenomena; and a participative pedagogic experience. The relationship between these conceptions and previously identified conceptions of teaching and learning is discussed.

Bruce, C. and Gerber, R. (1994) Towards university lecturers' conceptions of student learning. In R. Ballantyne and C. Bruce (eds.) *Phenomenography: Philosophy and Practice*. Proceedings. QUT, Brisbane, Australia, pp. 57-70.

The study reported here contributes to our understanding of students learning, describing it from the viewpoint of lecturers from a range of disciplines. From the viewpoint of these lecturers student learning was seen variously as: applying academic study skills; acquiring new knowledge; a cognitive experience; developing professional competence and the capacity to learn; changing personal attitudes, beliefs or behaviour; and a field of study. The relationship between these and previously identified conceptions of teaching and learning is discussed. (Extract from authors abstract).

Bruhn, J.K. (1989) Discourses of interviewing: validating qualitative research findings through textual analysis. In S. Kvale (ed.) *Issues of Validity in Qualitative Research*. Studentlitteratur: Lund (1989).

I want to argue that the qualitative field needs to develop more explicit and systematic methodologies which refer to language and communication as the central categories of analysis. The analysis of qualitative research data as forms of discourse may, in many ways, perform the functions which statistics has traditionally performed in quantitative types of analysis (p93).

Carlsson, M.A. (1991) *The Structure Of Recall: an empirical study of repeated readings of Franz Kafka s 'Before the Law'*. Reports from the Department of Education and Educational Research. Report No 1991:06. University of Goteborg.

One of a series of papers written about an investigation into different ways of understanding one of Kafka s parables. This paper explores the tendency for students remembering, or recall, to be within the framework of the narrative structure of the parable.

Carlsson, M.A., Marton, F. and Halasz, L. (1993) Readers experience and textual meaning: an empirical study. *Journal of Literary Semantics*, 22(2): 104-123.

One of a group of papers about students interpretations of Kafka s parable Before the Law . Describes the outcomes of the phenomenographic study and discusses implications for a literary interpretation of the text: ...the study of a response to a story turned into an empirical study of the meaning of the text itself. It is our hope that we have refuted the original idea which we ourselves originally nurtured, that Before the Law is an allegory in the traditional sense.

Chi Kin Lee, J., & Gerber, R. (1996) The lived experience of curriculum change: a Hong Kong perspective. *Curriculum and Teaching*, 11(1): 35-48.

This paper focuses on the lived experience of curriculum change using an example of senior secondary geography in Hong Kong. The results of the study - adopting a sociocultural approach - reveal that curriculum change is seen to be improving the relevance of the curriculum to the students' daily experiences as a benefit for student learning. The paper suggests implications for curriculum development.

Chaiklin, S., Fensham, P. and Marton, F. (1993) Scientific intuition through the eyes of Nobel laureates: analysis of discussions with the prize-winners in Science and Medicine during the years 1970-1986. Paper presented at the 5th European Association for Research on Learning and Instruction Conference, in Aix-en-Provence, August 31 - September 5.

Practically all laureates consider scientific intuition to be distinctly different from conscious, logical reasoning processes, and to concern the direction of research, more often the finding of a path than reaching the goal. The experience of intuition is frequently characterised as having a certitude based on a feeling or a perception of almost esthetic or quasi-sensory nature. (Extract from authors' abstract).

Clacherty, A.J. and Ballantyne, R.R. (1990) Understanding student experiences of environmental education: the value of a phenomenological approach, *Environmental Education and Information* 9(1): 29-42.

Attitudes, values, morals and ethics are important facets of environmental education. Evaluation of environmental education programmes must, therefore, include methods appropriate to these facets. A phenomenological approach to understanding environmental education experiences is presented and is shown, through the nature of the findings which emerge, to be valuable, powerful and worthy of inclusion in the field of environmental education evaluation. (Authors' abstract).

Cope, C. (1997) Learning about information systems: a relational perspective. HERDSA Conference, Adelaide.

Recent research on student leaning in higher education has identified systematic relationships between students' characteristics, perceptions of context, approaches to learning and learning outcomes. This research highlights the importance of understanding students' perceptions of their own learning experiences in a particular learning context as a precursor to improved teaching. The study reported in this paper investigated the learning experiences of fifty-seven students studying information systems (IS), a content area not previously studies from a relational perspective on learning. Prior conception of an IS, prior conception of learning and intended study approach were used as student characteristic variables. Actual study approach was the approach to learning variable and post conception of an IS and post conception of learning were the learning outcome variables. Relations between all possible pairs of these variables were investigated. Four different conceptions of IS were identified and described. Significant relationships were found between conception of an IS and any other variable. It is suggested that the low prior level of conceptual knowledge of an IS in the group (over 70% had not studied IS before) were responsible for this finding. In this circumstance, students' prior successful learning experiences in the departmental learning context become a more important influence on the study approach students adopt.

Cope, C., Garner, M., & Prosser, M. (1996) Using phenomenographic perspectives in the classroom. HERDSA Conference.

Phenomenography is a research approach used to investigate the different ways in which people conceptualise phenomena in the world around them, as means of studying thinking and learning. This paper proposes using phenomenography as a classroom teaching technique. The most consistent finding of phenomenographic research is that there are a varied but limited number of qualitatively different ways in which a concept can be understood. This means that in a classroom, lecturer and student may have quite different conceptions of the topic in hand. If this difference remains implicit, it is unlikely that teaching and learning will be effective. As a teaching technique, phenomenography can make students aware of their own and others' conceptions of the same phenomenon. Examples are given from courses about communication, information systems and physics. In general, students' descriptions of their conception of the phenomenon of interest are displayed to the class. A class discussion then aims to categorise the descriptions and compare levels of understanding. The paper highlights the benefits of this teaching technique which include: making students aware that there are different ways of conceptualising a phenomenon; encouraging

students to compare conceptions, as a starting point for developing better levels of understanding; and indicating to the lecturer the level at which the learners are operating. These benefits can lead to improved teaching practices.

Crawford, K., Gordon, S., Nicholas, J., & Prosser, M. (1995) Patterns of meaning of students' mathematical experiences at university. MERGA 18 - Galtha, Darwin 1995: eighteenth annual conference of the Mathematics Education Research Group of Australasia (MERGA), Northern Territory University, Casuarina NT: Mathematics Education Research Group of Australasia (MERGA).

This paper reports on research into the conceptions of mathematics, orientations to studying it and experiences of learning it of first year mathematics students at Sydney University. Questionnaires were issued to students at the beginning of the academic year and after one semester.

Crawford, K., Gordon, S., Nicholas, J., & Prosser, M. (1994) Conceptions of mathematics and how it is learned: the perspectives of students entering university. *Learning and Instruction*, 4(4): 331-345.

This paper reports results from an investigation to identify the conceptions of mathematics held by beginning university students and their approaches to the study of mathematics. Phenomenographic techniques were used to analyse responses to a questionnaire administered to approximately 300 students. An analysis of the results identified a structural relationship between students' conceptions of mathematics and their approaches to learning it, with the majority of students viewing mathematics as a necessary set of rules and procedures to be learned by rote. The results of this research have implications for the ways in which teaching and learning are constituted within universities.

Crawford, K., Gordon, S., Nicholas, J., & Prosser, M. (1993) Learning mathematics at university level: initial conceptions of mathematics. Contexts in Mathematics Education: Proceedings of the Sixteenth Annual Conference of the Mathematics Education Research Group of Australasia (MERGA), July 9-13, 1993, Brisbane, Kelvin Grove Qld: Mathematics Education Research Group of Australasia.

This paper reports preliminary results from an ongoing investigation to identify the conceptions of mathematics held by beginning first year university students and their orientations to their previous study of mathematics. A questionnaire was administered to approximately three hundred students during their first week at university. The questionnaire contained five open ended questions designed to elicit students' own conceptions of mathematics and their orientations to studying it. Two of these are discussed in this paper. Phenomenographic techniques were used to analyse responses and identify qualitatively different categories of description. In-depth interviews of a subsample of twelve students revealed details of the range of conceptions of mathematics and the related qualitative differences in approaches to learning mathematics after several weeks of university mathematics. Analysis of responses revealed that, although a wide range of beliefs was elicited, the majority of students view mathematics as a necessary set of rules and procedures to be learned by rote that are unrelated to other aspects of their lives. The survey results also indicate a relationship between conceptions of mathematics and approaches to studying mathematics at university level. There was no evidence of gender differences in either conception of mathematics or approach to learning. This paper also reports on the evidence of relationships between conceptions of mathematics, approaches to learning and course results. These preliminary results raise questions about the impact of prior experience on approaches to learning mathematics at university level and the quality of learning outcomes.

Cust, J. (1996) A relational view of learning: implications for nurse education. *Nurse Education Today*, 16(4): 256-266.

For about two decades, student learning in the context of professional and higher education, more generally, has been investigated by groups of researchers in countries such as Sweden, the UK, Australia and South Africa. The focus in many of these studies has been on the experience of students as they undertake complex, realistic tasks such as reading academic articles, listening to lectures, writing essays, solving problems and learning subject matter concepts. Central to this research is the adoption of a relational and holistic model of learning in which the relationships among all elements in the learning situation, including the student, the learning task, the teaching methods and assessment practices have been investigated. In particular, researchers from this line of inquiry have studied the relationship between the ways students go about learning in natural educational settings, referred to as approaches to learning, and what they learn. They have established that a full understanding of subject matter is reliant on students employing deep learning approaches which, in turn, depend on the perceived learning environment encouraging such learning. In this paper, the work of the relational theorists is described and the substantial and practical findings arising from this school of research are reported. Specific implications for the education of undergraduate nurses are also outlined.

Dahlberg, K. (1995) Qualitative methodology as caring science methodology. *Scandinavian Journal of Caring Sciences*, 9(3): 187-191.

Interest in the use of qualitative methodology is increasing among researchers within the field of caring sciences. Several reasons might account for this growing interest: disappointment from experiences with quantitative methodology in this field; interest in caring issues which do not lend themselves to quantitative analysis; and, simply, an emerging appreciation of qualitative methodology. There is a need for additional clarity about the applications of qualitative methodology in explication of caring. The major questions concern the suitability of qualitative methodology to the study of caring and the scientific status of qualitative methodology. This paper advocates qualitative methodology as a methodology of choice for scientific exploration in the field of caring.

Dahlgren, L.O. (1993) Problem-based learning. Experiences from the Health University Linköping, Sweden. Occasional paper 93.2 ERADU:RMIT.

This is an English summary of a Swedish book on problem based learning. The book is the result of a year-long co-operation project amongst 47 people, all of them active as teachers, researchers and/or clinicians at the Health University in Linköping where physicians, as well as paramedical professionals, are educated... The book is a description of the theoretical considerations underlying the reform, and it also contains a fairly straightforward account of everyday life for teachers and students. (p1)

Dahlgren, L.O. (1989) Fragments of an economic habitus. Conceptions of economic phenomena in freshman and seniors. *European Journal of Psychology of Education*, 4(4): 547-558.

The article reports on parts of an empirical longitudinal study. Students of engineering, business administration, medicine and psychology have been interviewed at the beginning and at the end of their education. The focus in the present article is on the students of business administration. Two of the questions in the interview asked for students conceptions about the most prominent contemporary economic problem and the cause of famine in the underdeveloped countries. (Extract from author's abstract).

Dahlgren, L.O. (1984a) Outcomes of learning. In F. Marton, D. Hounsell and N. Entwistle (eds.) *The Experience of Learning*. Edinburgh: Scottish Academic Press.

This chapter explores quantitative and qualitative conceptions of knowledge, and moves on to argue that students learning outcomes vary in terms of their understanding of the phenomena being studied. Concludes a study of qualitative differences in outcome has a vitally important role to play in helping to determine - and ultimately improve - the quality of student learning .

Dahlgren, L.O. (1984b) Higher education - impact on students. In T. Husen and N. Postlethwaite (eds.) *The International Encyclopaedia of Education*. Pergamon Press: London, vol.4, pp. 2223-2226.

The question of the impact of higher education upon students has attracted intense and quantitatively impressive interest since the 1930s. This article reviews those parts of that research tradition which have been devoted to the cognitive effects of higher education (p2223). Concludes that ...if a greater understanding of the more enduring aspects of the impact of higher education on individuals is desired, research efforts will have to be intensified to illuminate what students really learn rather than measuring how much they remember of the actual content of their education (p2225).

Dahlgren, L., Diwan, V.K., Tomson G. and Wahlstrom, R. (1992) On the variation in conceptions among primary care physicians regarding hypercholesterolaemia: a phenomenographic analysis. *Scandinavian Journal of Primary Health Care*, 10: 316-320.

Twenty primary care physicians at 12 health centres in Sweden were interviewed in a semi-structured way. Analysis was conducted using a phenomenographic method (Extract from authors abstract).

Dahlgren, L.O. and Fallsberg, M. (1991) Phenomenography as a qualitative approach in social pharmacy research. *Journal of Social and Administrative Pharmacy*, 8(4): 150-156.

Various perspectives in qualitative research in the behavioural sciences are described and compared. A Swedish contribution to this family - phenomenography - is scrutinised in more detail. A recent example of an application of phenomenography in social pharmacy research is thereafter provided. The implications of this kind of research are discussed..... (Extract from authors abstract).

Dahlgren, L.O. and Marton, F. (1978) Students conceptions of subject matter: an aspect of learning and teaching in higher education. *Studies in Higher Education*, 3(1): 25-35.

Early writing on viewing teaching as changing conceptions - from a phenomenographic perspective. The focus by way of examples is on qualitatively differing conceptions of economics concepts - including the famous price of a bun example.

Dahlgren, L.O. and Pramling, I. (1985) Conceptions of knowledge, professionalism and contemporary problems in some professional academic subcultures. *Studies in Higher Education*, 10(2): 163-173.

The paper reports some results of a longitudinal interview investigation on the general and specific effects of higher education on the way some central phenomena are conceptualised by students of medicine, business administration and engineering . (Extract from authors abstract).

Dahlin, B. (1994) An epistemology of conceptions and its educational significance. In R. Ballantyne and C. Bruce (eds.) *Phenomenography: Philosophy and Practice*. Proceedings. QUT, Brisbane, Australia, pp. 87-110.

Presuming that conception in the phenomenographic sense represents a form of knowledge of the world around us, theoretical reflections on the nature of conceptions take on an epistemological character. This paper presents such a reflection, drawing partly on the phenomenology of Merleau-Ponty and Heidegger and Dewey's philosophy of experience. (Extract from author's abstract).

Dahlin, B. and Regmi, M.P. (1995) Conceptions of learning among Nepali students. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

The paper describes a phenomenographic study of conceptions of learning among Nepali students. Thirty students from various disciplines at Tribhuvan University in Kathmandu were interviewed about their understanding and experience of learning. The results are related to previous studies in Nepal, using the Study Process Questionnaire and written responses to open questions. They are also compared to similar phenomenographic studies done in the West. The present study indicates that 'meaning' is a more salient feature of Nepali conceptions, as compared to those found in the West. Nepali students also look upon memorizing and understanding as interlinked in a way not usually found among Western students. Finally, they tend to see learning as a change of behaviour, but not of the person in a deeper, existential sense. (Author's abstract).

Dall Alba, G. (1995) *Learning to be a medical doctor: Orientations when starting out*. Gold report series 60. Stockholm: MIP, Karolinska Institute.

What does medical practice mean to students entering undergraduate medical education? What do these students see as central to the work of a medical doctor? What do they regard as difficult challenges they are likely to face in medical practice? What implications do their perspectives on these questions have for medical education? In the study reported in this article students beginning undergraduate medical education characterised medical practice in a variety of ways. In brief, they characterised medical practice as: (a) helping or saving; (b) diagnosing or treating using required procedures; (c) locating the problem and informing the patient; (d) while diagnosing and treating, interacting in a supportive way; (e) seeking a way forward together; and (f) enabling the patient to better deal with his or her life situation. Some differences based on gender and method of admission to medical education are noted.

The ways of characterising medical practice have in common particular dimensions of the doctor-patient encounter around which they vary. Those common dimensions are: purpose of the encounter between doctor and patient; nature of the encounter between doctor and patient; nature of knowledge relevant to the encounter; and time period relevant to the encounter. Implications for medical education include the need to address: the ways in which medical knowledge is viewed; students' concerns about human aspects of medical practice; professional development especially of female students; non-biomedical aspects as mainstream in the medical curriculum; and the students as a resource.

Dall Alba, G. (1994a) Reflections on phenomenography- introduction to Part III. *Nordisk Pedagogik*, 14(1): 35-38.

Dall Alba reviews Bo Johansson's paper entitled What do the statements deal with and from whence do they come? at some length. Johansson critiques Dagmar Neuman's work into children's conception of number from the perspective of cognitive science.

Dall Alba, G. (1994b) Reflections on phenomenography - introduction to part IV. *Nordisk Pedagogik*, 14(2): 66-70.

Introduces Roger Säljö's article Minding Action.

Dall Alba, G. (1994c) Reflections on some faces of phenomenography. In J. Bowden and E. Walsh (eds.) *Phenomenographic Research: Variations in Method*, EQARD, RMIT.

My aim in this paper is to describe some research studies in which I have been involved, emphasising the research methodology and the principles underlying that methodology. I have selected particular examples to demonstrate how studies with varying purposes and methods can be based on principles of phenomenographic research (p73).

Dall Alba, G. (1993a) Reflections on Phenomenography. *Nordisk Pedagogik*, 13(2): 66-67.

Introducing a series of papers which intends to examine the contributions made by research and practice which is based on this approach and to explore how phenomenography can be developed in the future (p66).

Dall Alba, G. (1993b) Reflections on phenomenography - introduction to Part II. *Nordisk Pedagogik*, 13(3): 130-133.

Introduces two papers: Michael Uljens on the relation between phenomenography and phenomenology; and Bjorn Hasselgren's paper which questions whether phenomenography can legitimately be called a research approach. The introduction to the latter paper provides us with an English summary of the critique which appears in Swedish.

Dall Alba, G. (1992) *The Role of Teaching in Higher Education: Enabling Students to Enter a Field of Study and Practice*. Occasional Paper 92.5, ERADU, RMIT.

This paper reports a study into the various ways in which teachers see the content of a course of study. Data gathered from teachers from a range of disciplines yielded the following ways of seeing course content:

1. Course content as body of knowledge and skills
2. Course content as concepts and principles to which knowledge and skills are linked
3. Course content as experiences of a field of study and practice

The paper is couched within a framework of seeing teaching as developing competent professional practitioners. Questions of what it means to approach geography as a geographer would, language as a linguist does, and so on are raised, as are questions of implications for teaching.

Dall Alba, G. (1991) Foreshadowing conceptions of teaching. *Research and Development in Higher Education*, Vol. 13. Papers presented at the 16th HERDSA Conference held at Griffith University, 6th -9th July 1990, B. Ross (ed.) HERDSA, Sydney.

This is a short paper outlining the findings of a pilot study into teachers' conceptions of teaching. Conceptions identified from transcripts of twenty interviews include:

- o Teaching as Presenting Information
- o Teaching as Transmitting Information
- o Teaching as Illustrating the Application of Theory to Practice
- o Teaching as Developing Concepts/Principles and their Interrelations
- o Teaching as Developing the Capacity to be Expert
- o Teaching as Exploring Ways of Understanding From Particular Perspectives
- o Teaching as Bringing About Conceptual Change

Dall'Alba, G., & Hasselgren, B. (Eds.) (1996) *Reflections on phenomenography : toward a methodology*. Göteborg, Acta Universitatis Gothoburgensis.

Contents: Dall'Alba, G.: Reflections on phenomenography - an introduction. -- Säljö, R.: minding action - conceiving of the world versus participating in cultural practices -- Hazel, F.: Advancing phenomenography - questions of method -- Bowden, J. A.: Phenomenographic research - some methodological issues -- Hasselgren, B.: Tytti Soila and the phenomenographic approach -- Pramling, I.: Phenomenography and practice -- Uljens, M.: On the philosophical foundations of phenomenography -- Sandberg, J.: Are phenomenographic results reliable? -- Johansson, B. S.: What are the statements about and from where do they come? -- Marton, F.: Cognosco ergo sum - reflections on reflections.

Dall Alba, G. and others (1991) *Textbook Treatments and Students Understandings of Acceleration*. Occasional Paper 91.3. ERADU. RMIT.

Further phenomenographic exploration of students' understanding of physics concepts. This research was supported by an ARC grant.

Dall'Alba, G., & Sandberg, J. (1996) Educating for competence in professional practice. *Instructional Science*, 24(6): 411-437.

Discusses educating for the professions where teachers seek to enable students to engage in professional practice as competent practitioners, questions the adequacy of traditional approaches for promoting competence practice, and suggests that competence development focus on enriching experience of practice and change in the structure of the meaning for practice.

Dall'Alba, G., Walsh, E., Bowden, J., Martin, E., Marton, F., Masters, G., et al. (1989) *Assessing understanding: a phenomenographic approach*. Selected Refereed Papers from the Twentieth Annual Conference of the Australian Science Education Association, held at the Frankston Campus of the Chisholm Institute of Technology, July 1989. R. P. Tisher. Clayton Vic, Australian Science Education Research Association: 47-56.

This paper describes a research study that is concerned with the assessment of students' levels of understanding of key concepts and principles in science.

Drummond, J. and Embree, L. (1992) *The Phenomenology of the Noema*. Kluwer Academic Publishers, The Netherlands.

The terms noema and noesis, were coined by Edmund Husserl to describe intentionality. His description of the noema has since been subject to considerable interpretation and no little controversy. For phenomenographers, this collection of papers dealing with aspects of the noema, is important because of the comparison drawn between the noema and noesis of phenomenology, and the concepts of structure and reference. ...this volume is itself testimony to the fact that there is still work to be done and precision to be attained in our analyses of the noemata of particular experiences, in our understanding of the types of identities realized in manifolds of noematic phases and of identity-syntheses realised in different types of acts, in short, of our full understanding of the Husserlian doctrine of the noema and of its philosophical significance (p6).

Duke, M., Forbes, H., Hunter, S., & Prosser, M. (1995) The perceptions of problem-based learning (PBL) held by undergraduate students of nursing: a progressive analysis. In P. Little, M. Ostwald and G. Ryan (eds.) *Assessment and evaluation*. Sydney, Australian Problem Based Learning Network: 137-148.

Ebenezer, J. V., & Erickson, G. L. (1996) Chemistry students' conceptions of solubility: a phenomenography. *Science-Education*, 80(2): 181-201.

Conceptions of (n=13) grade-11 chemistry students via interviews were grouped into 6 categories related to students' preferred explanations for solubility phenomena. Argues that an understanding of the typical conceptions used by students should form an integral component of chemistry teaching, both as points of origin for lesson planning and for development of curricular materials.

Eizenberg, N. (1986) Applying student learning research to practice. In J. Bowden (ed.) *Student Learning: Research Into Practice*, CSHE: University of Melbourne.

Eizenberg examines the five conceptions of learning, and approaches to learning (Marton and Säljö 1984) - then investigates how such an understanding of students can be used to influence anatomy teaching. He discusses interventions in teaching, curriculum and assessment. This is considered to be an important paper in the bringing together of teaching research and practice in higher education.

Ekeblad, E. (1995a) *First-grader's conceptions of "How you learn maths"*. Paper presented at the 23rd congress of the NFPF, Aarhus, Denmark, March 16-19, 1995.

The present paper is intended as a contribution to the continued mapping of the phenomenography of learning from the perspective of children. The context is a study concentrating on first-grade children's understandings of "learning maths". The paper presents an analysis of the relevant sections of two interviews with the same group of children, carried out within the boundaries of a broader study aiming to explore the possibilities of using the computer as a tool for the development of children's conceptions of numbers. Sections on "learning maths" were included in the framing interviews, one at the very beginning of the first year in school, and the other towards its end. At school start the children were asked questions on the theme of how you learn things like counting or adding, which they had first suggested as examples of "doing maths." In the final interview the corresponding theme was introduced as: What do you think you have learned in maths this year? and continued on the theme of: How do you learn that kind of stuff?

Ekeblad, E. (1995b) *Talking phenomenography. Some reflections occasioned by Säljö's article on "Minding action."* Paper presented at the 23rd congress of the NFPF, Aarhus, Denmark, March 16-19.

In a recent article Roger Säljö criticises some features of phenomenography, all related to a view of language as a "device for representing the world," which is, according to Säljö, inherent in phenomenography. Against this he poses his own view of language as "a medium for action; when you talk you do things" (Säljö, 1994, p. 78).

So, what is Säljö trying to accomplish by talking phenomenography the way he does in his article? And how does he use language as a medium for action? Apparently his goal in the final analysis is no less than a general abandonment of phenomenography. Although he opens the discussion on a humble note, and although the article may be read as one more contribution to a discussion aiming to improve the methods of phenomenography, in effect he argues against the phenomenographic notion of conception, replacing it with discourse processes as an alternative object of research, thereby renouncing phenomenography altogether.

In this paper I first argue that the version of phenomenography constructed by Säljö is tailored to fit as the less favourable contrast to the alternative he wishes to promote, and that there are other conceivable versions of phenomenography. It is even possible to understand language as a medium for action, and still do phenomenography. I go on to examine some aspects of how he employs language as a medium of action, and I finish with some reflections on what may happen when we subsume the discourses of educational research under the heading of language-in-action. (Adopted from author's abstract).

Ekeblad, E. (1993) Arithmetic without reading: children interpreting representations of part-whole relations. *Computers in Human Behavior*, 9(2-3): 213-225.

Presents a phenomenographic approach to numbers concepts and games for children. Educational computer use with young children involves the design of an interface in which the pedagogical content is presented without recourse to reading. This creates certain interpretation problems. In the subject matter area of basic number concepts, questions about the number of objects flashed are suitable for nonverbal presentation, whereas nonverbal presentations of questions about additive or subtractive operations tend to be misinterpreted. The simultaneous grasping of a numerical whole and its parts is the center around which the whole range of computer games revolves. Viewing the game as a dialog is discussed, as is the inclusion of arithmetic operations.

Ekeblad, E. and Bond, C. (1995) A phenomenography of learning in context. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

Issues of context are currently being revitalized in educational research. There is a movement away from studies of internal, mental processes and towards a renewed concern about the fact that processes of learning always unfold in interaction with 'the world around us'. Working in a line of research towards 'a phenomenography of learning', we take seriously the notion of internal relations between persons and phenomena. This leads us to recognise that relations between persons and situations must also be considered as internal. In our paper we present material from two longitudinal studies: one of psychology students' conceptions of learning within the context of their studies, and one of first-graders' conceptions of the learning of arithmetic in the beginning and towards the end of their first year in school. We investigate the relation of conceptions to context, and consider the relation between phenomenographic categories of description and the experiential reality they promise to describe. This means partly a restatement of old tenets of phenomenography in the terms of current discussions; partly it means an exploration of what it means to create a phenomenography of learning that takes account of contexts of learning. (Author's abstract).

Ekeblad, E. and Lindstrom, B. (1995) The role of phenomenographic research in the design of instructional computer applications for number concepts. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

Four principles of design and one overarching subject-matter-related principle were the guidelines for a project aimed at developing instructional computer applications based on phenomenographic research in the area of young children's basic number concepts. The overarching domain-specific principle was to 'promote structuring conceptions of numbers over counting conceptions'. The four design principles were that the computer would be used to present 'crucial problems', to introduce 'variation' in some important dimension, to present analogies serving as 'bridges' between the familiar and the unknown, and to 'confront the children' in situations where a less functional conception would be revealed by the computer as yielding an incongruous representation of the world. A number of educational games were developed in an iterative process of moving back and forth between software design and research aimed at exploring children's conceptions of numbers in connection with use of the developed software. This paper presents a reflective analysis of the design, the history of

development and the documented use in classroom-based research of some of our games, focusing on how principles turn out when applied in practice. (Author's abstract).

Ekeblad, E. and Bond, C. (1994) The nature of a conception: questions of context . In R. Ballantyne and C. Bruce (eds.) Phenomenography: Philosophy and Practice., Proceedings. QUT, Australia, pp. 147-162.

What is a conception? What does it mean to treat a conception as an internal relation between person and phenomenon? What is the nature of the implicitness of the contextuality of a conception? This paper attempts to address these and other complex issues, illustrating the discussion in relation to two phenomenographic studies. (Adapted from authors abstract).

Entwistle, N. (1994) Experiences of understanding and strategic studying. Annual Meeting of the American Educational Research Association, New Orleans, LA.

In an effort to further explore the experience of understanding from the university perspective, this study examined how British students' understanding was refined and committed to memory during preparation for final examinations. After piloting an interviewing procedure, in-depth interviews were conducted with eleven students from psychology (including two pre-med students taking a year out) and zoology. Through a flexibly structured interview schedule, students were taken through their revision strategies, with a particular focus on how they developed understanding and used visualization in its recall. Another 11 psychology students were asked to provide written responses describing their experiences of understanding. As the results of this first study related only to the context of revising for examinations, and as the sample was restricted in both size and range of discipline, the work is currently being extended through two hour-long interviews with twelve final year historians. The current study concerns understanding not just during revision, but also through writing essays as course work (term papers) and in Finals. The analysis found that the experience of understanding involved strong feelings of coherence and connectedness, together with confidence about explaining or using the knowledge acquired. Students differed in terms of the breadth of their understanding and in the depth or level of understanding which was a function of the effort put into making connections within the material and with related ideas and experiences. Only two students studied without any use of structure. Several students relied on the structure they had in their lecture notes. Other students developed structures designed to fit perceived requirements of previous years' examination questions. Only two types of structures drew on wide, active reading and involved an independent transformation of what was being learned. The five different kinds of structure, allied to parallel variations in breadth and depth, were described as "forms of understanding" (Entwistle & Entwistle, 1991) and depended on differing approaches to learning and studying.

Entwistle, N. and Marton, F. (1994) Knowledge objects: understandings constituted through intensive academic study. *British Journal of Educational Psychology*, 64: 161-178.

Paper reports a re-analysis of data gathered from final year degree students focussing on their use of visualisation to support memory.

Entwistle, N., & Tait, H. (1995) Approaches to studying and perceptions of the learning environment across disciplines. *New Directions for Teaching and Learning*, 64: 93-103.

Drawing on a number of studies of college student learning, this review concludes that students in different disciplines develop characteristic ways of learning based on their perceptions of what is required in their academic work. Within a discipline, effective learning involves an interplay between the characteristics of the student and the learning environment provided by teacher and department.

Fairhall, D. (1986) What is basic indexing? Towards a definition for teaching and research. *Education for Librarianship: Australia*, 3(2): 5-16.

Dissatisfaction is expressed with research on the learning of subject cataloguing or indexing which does not refer to fundamental theory of student learning and of indexing. Two traditions of learning theory are reviewed: the phenomenographic school originating with Marton and his colleagues in Goteborg which has identified deep or meaning-seeking approaches and surface or reproducing approaches to learning, and Pask's experimental studies of serialist and holist learning styles. Both theories point to the importance of our giving our curricula a theoretical structure if we wish students to learn with understanding.

Fensham, F. and Marton, F. (1991) High School Teachers and University Chemists Differing Conceptualisations of the Personal Activity in Constituting Knowledge in Chemistry. *Fenomenografiska Notiser* 11. Report no 1991:01. Dept of Education and Educational Research. University of Goteborg.

High school teachers were compared with university chemists ... concerning their views of theory in Chemistry.

Ferris, J. and Gerber, R. (in press) Mature-aged students feelings of enjoying learning in a further education context. *European Journal of Psychology in Education*.

Students enjoyment in learning is an aspect of the quality of learning which has not been a focus for educational researchers despite its obvious relationship to success in learning. This study adopts a non-dualistic approach to investigate the reflected experience of their enjoyment in learning of sixteen mature-age students in an Australian institution for further education. Through a phenomenographic analysis of interview transcripts, the researchers discerned six qualitatively different ways in which the students experienced enjoyment in their learning in further education. These conceptions of enjoying learning in further education are structurally related in terms of the personal experience, the institution's perceived approach to learning, the relevance of the learning to the students careers, the nature of the learning environment, the presence of learning stimuli and the intellectual challenge involved in the learning itself. (Author's abstract).

Fetterman, D. M. (1989) Qualitative approaches to evaluating education. *Educational Researcher*, 17(8): 17-23.

Discusses qualitative research and its application to educational evaluation. Approaches discussed include the following: (1) ethnography; (2) naturalistic inquiry; (3) generic pragmatic (sociological) inquiry; (4) connoisseurship/criticism; (5) metaphors; and (6) phenomenography.

Foster, G. (1994) Fishing with the net for research data. *British Journal of Educational Technology*, 25(2): 91-97.

Extended descriptive documents, such as transcripts of interviews, are a source of data which is gaining in importance as phenomenographic approaches to qualitative research become more widely used as computer software is developed to aid the task of analysis. This article describes a trial of a method of data gathering using electronic mail over international computer networks which might present real advantages over face to face interviews in terms of labour of transcription, since the information arrives already in a form readable by analytical software. Additional advantages are the widening of geographic scope, by the elimination of the need for researchers to travel to meet respondents; and the freedom for 'interviewing' to be done at times convenient to both parties. There are, however, a number of issues arising which need to be taken into account if the technique is to be fully effective.

Francis, H. (1993) Advancing phenomenography-questions of method. *Nordisk Pedagogik*, 13(2): 68-75.

This paper aims to examine and develop aspects of the research methods used in phenomenography. The conclusion stresses the importance of appropriate design and reporting of research procedures and their justification if a promising program of research in educational psychology is to win even wider appreciation. (Extract from author s abstract).

Franke, A., & Dahlgren, L.O. (1996) Conceptions of mentoring: an empirical study of conceptions of mentoring during the school-based teacher education. *Teaching and Teacher Education*, 12(5): 627-641.

To determine conceptions of mentoring, Swedish researchers videotaped mentoring sessions between student teachers and their cooperating teachers and conducted interviews with both groups. Data analysis indicated that the two groups had different conceptions about the function of mentoring and its content and form.

Fulop, M. (1995) Hungarian students' concepts of understanding literature. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

In our interview study carried out in the final year of their university studies, twenty-five student teachers of literature at Eotvos University in Budapest were asked about their views on understanding literature. In carrying out this investigation the phenomenographic approach to research was applied. In this case it meant that the study aimed at revealing and characterizing the qualitatively different ways in which these teacher-to-be students experience and conceptualize understanding literature. As a result of the phenomenographic analysis three main dimensions of thinking about understanding literature have emerged: I, The origin of meaning: the meaning is in the text; the meaning is in the reader; the meaning is the result of the interaction that takes place between the text and the reader; II, The question of proper understanding: understanding is a finite process; understanding is an endless process; III, Understanding as a process: finding the core; having a cross-cut view; putting the puzzle together; peeling the onion; finding focal points, forceful features; threading the beads, the blooming flower. A more detailed description of the different dimensions is reported in the paper, stressing the importance of the results in the practice of teaching literature. (Author s abstract).

Gerber, R. (in press) Interpretive approaches to geographical and environmental education research. In M. Williams (ed.) *Understanding Geographical and Environmental Education*. London: Cassell. Chapter 2, pp. 12-25.

This chapter demonstrates how interpretive humanistic approaches to qualitative research offer an excellent basis for research in geographical and environmental education. Emphases are placed on selecting research questions, gathering and analysing data, and aspects of quality across the research process. (Author s abstract).

Gerber, R. (1995) Students Understanding of the Concept of Global Change in their Geographical Education. Paper presented to Global Changes and Geography, Conference of the International Geographical Union, Moscow, Russia - August 14-18, 1995.

The concept of global change is a key one that is found in many geography curricula in secondary schools around the world. Students are encouraged to make geographical studies at different scales ranging from local area studies to studies on a global scale. Such studies are conducted in geography classrooms in order to describe and explain the current geographical situations as well as to establish how these situations have changed over time and space. Geography textbooks and reference books have included a range of studies at a global level. These have included: studies of global climate change; varying demographic, social and economic indices; investigations of resource usage and physical geographical activities such as volcanic eruptions. All of these studies involve elements of change and have had differing impacts on global activity. They indicate varying expert interpretations of people-environment interactions on a global scale. While these are usually very informative accounts and explanations, the scale of the global studies leaves one in wonder if the students who read these accounts are able to relate to and can experience global geographical activities meaningfully.

Therefore, the study reported here seeks to find out the extent to which adolescent students who are studying geography in Australia do understand the concept of global change based on their geographical education. The study will report on the qualitative variations which emerge from interviews with approximately 25 students in the third year of their secondary geography studies. Using a semi- structured interview method the students will be asked to describe, based on their geography class experiences, their understanding of how the world is changing. The students, approximately equal numbers of boys and girls, will be asked to describe how these in-class experiences are enhanced or challenged by other lived experiences, e.g. the impact of the media or travelling to different parts of the world. The transcriptions from the interviews will be pooled and analysed using a phenomenographic research method that is designed to detect the qualitatively different variations in the students experience. The resulting categories of description will be related to indicate any structural relationships amongst these variations in the students experience of global change.

A comparison will be made to the understandings of global change that are evident in the most popular geography text and reference books that are available to these students. Implications will be drawn for geography curriculum development and classroom didactics from the results. (Author s abstract).

Gerber, R. (1994) Variations in the experience of geography by pre-service geographical educators. *Geographical Education*, 7(2): 26-33.

Gerber, R., & Kwan, T. (1994) A phenomenographical approach to the study of pre-adolescents' use of maps in a wayfinding exercise in a suburban environment. *Journal of Environmental Psychology*, 14(4): 265-280.

Studied how 16 12-yr-old male students found their way around a designated suburban route by referring to a sequential listing of streets along the route and a street directory map of the suburban area. A phenomenographical approach was used. Ss' experiences were interpreted using a behavioral matrix of their actions while they traversed the route. Qualitative variations in their approaches to wayfinding using maps were obtained from interviews that were conducted immediately after the Ss completed their route navigation. From the Ss' reflections of their own wayfinding behaviors, 4 qualitatively different approaches were determined: restricted and neophytic; careful and sequential; deductive and familiarized; and visualized and coordinated.

Gerber, R. (1993a) A sense of quality - qualitative research approaches for geographical education. In H. Jager (ed.) *Liber Amicorum Prof Niemz*. Frankfurt am Main, Goethe University Press.

Qualitative research is becoming a well-established form of research in the humanities and social sciences. Geographical educators are only now becoming interested in a breadth of approaches to qualitative research. This article seeks to illuminate geographical educators understanding of qualitative research; describe some of the challenges that geographical educators face when they undertake qualitative research studies; highlight the importance of truthfulness in such research studies and offer advice on aspects to consider when developing a qualitative research proposal.

Gerber, R. (1993b) A sociocultural approach to curriculum change. Paper presented to the National Conference of the Australian Curriculum Studies

"This article seeks to demonstrate how a (sociocultural) approach may be used in the development of an understanding of a curriculum change in an Australian educational context. It focuses on memories that stakeholders to this change have of their conscious actions during the change." (Extract from author s abstract).

Gerber, R. (1992a) *Phenomenography as an important qualitative approach to research in geography*. Paper presented to the International Geographical Union Symposium on Geographical Education, Boulder, Colorado, August 3-7, 1992.

Begins with a discussion of the nature of qualitative research and phenomenography as a form of qualitative research. Reports a study into conceptions of geography amongst trainee Geography teachers. Reflections on the phenomenographic research technique and the development of this research approach into the 1980's and 1990's follow. Concludes with a series of suggestions about the application of phenomenography to geography and geographical education.

Gerber, R. (1992b) *Phenomenography as a qualitative research approach beyond the individual*. Paper presented to the Third National Social Research Conference, University of Western Sydney, 1 July 1992.

Phenomenography is a relatively new qualitative approach to research that considers the discovery of regularities in data provided by people. In its classic sense phenomenography accepts that people develop their knowledge of the world through personal experience. Therefore, all knowledge is subjective in nature. The experiences that people have of selected phenomena, such as geographical concepts, learning processes or landscape, are recorded in the words or other expressions by the participants in a specific context..... variations of the phenomenographic approach may be applied to studies in geography and geographical education in a number of ways. These include: an investigation of different conceptions that learners hold of specific geographical concepts; consideration of the types of learning that occur in geography classrooms, investigations of the processes that learners use and experience in undertaking studies of specific topics in geography; and investigations of discourse and other cultural elements that abound in the geography classroom. (Adapted from author s abstract).

Gerber, R. and Bruce, C. (eds.) (1995a) *Lars Dahlgren on Qualitative Research. Phenomenography - Qualitative Research: Theory and Applications*. Video 1. Queensland University of Technology.

This video series is for researchers and students who wish to understand the history and potential of qualitative research and phenomenography. Ference Marton, Lennart Svensson and Lars Dahlgren present clear explanations of the phenomenographic approach and how it differs from other qualitative approaches - each from his own perspective. Data gathering, in the form of capturing participants approach to a task and interviews, is demonstrated in relation to a project on children s experience of wayfinding around a suburban environment. The series is a perfect introduction to the field for novices and an important record of the thinking of leading phenomenographers in the 1990s.

Gerber, R. and Bruce, C. (eds.) (1995b) *Lars Dahlgren on Phenomenography. Phenomenography - Qualitative Research: Theory and Applications*. Video 2. Queensland University of Technology.

Gerber, R. and Bruce, C. (eds.) (1995c) *Lennart Svensson on Qualitative Research and Phenomenography. Phenomenography - Qualitative Research: Theory and Applications*. Video 3. Queensland University of Technology.

Gerber, R. and Bruce, C. (eds.) (1995d) *Ference Marton on Qualitative Research and Phenomenography. Phenomenography - Qualitative Research: Theory and Applications*. Video 4. Queensland University of Technology.

Gerber, R. and Bruce, C. (eds.) (1995e) *Gathering Phenomenographic Data: an example from wayfinding. Phenomenography - Qualitative Research: Theory and Applications*. Video 5. Queensland University of Technology.

Gerber, R. and Boulton-Lewis, G. (1995) *Teachers' understanding of graphic representations of quantitative information*. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

People are encountering more and more graphic representations of data in their learning and teaching. Much of this data occurs in quantitative forms as different forms of measurement are incorporated into the graphics during their construction. In formal education, teachers use a range of these quantitative representations in subjects across the school curriculum. Previous research that focuses on the use of information processing and traditional approaches to cognitive psychology concludes that the development of an understanding of such representations of data is a complex process for learners. Teachers need to understand this process in order to maximize the learning of their students. An alternative approach is to investigate the experiences of students as they interact with graphic representations of quantitative information in their own life- worlds. Similarly, for teachers to grasp the nature of these experiences they should understand how they see this information for themselves. This paper demonstrates how a phenomenographic approach may be used to reveal the qualitatively different ways in which teachers in a group of urban Australian secondary schools understand the phenomenon of graphic representations of quantitative data. The variations revealed in the study will be compared to those found in a similar study that was conducted with students aged 8 to 16 years in these schools. (Author s abstract).

Gerber, R., Boulton-Lewis, G. and Bruce, C. (1995) *Children s understanding of graphic representations of quantitative data. Learning and Instruction*, 5: 77-100.

Children are encountering more and more graphic representations of data in their learning and everyday life. Much of this data occurs in quantitative forms as different forms of measurement are incorporated into the graphics during their construction. In their formal education, children are required to learn to use a range of these quantitative representations in subjects across the school curriculum. Previous research that focuses on the use of information processing and traditional approaches to cognitive psychology concludes that the development of an understanding of such representations of data is a complex process. An alternative approach is to investigate the experiences of children as they interact with graphic representations of quantitative data in their own life- worlds. This paper demonstrates how a phenomenographic approach may be used to reveal the qualitatively different ways in which children in Australian primary and secondary education understand the phenomenon of graphic representations of quantitative data. Seven variations of the children s understanding were revealed. These have been described interpretively in the article and confirmed through the words of the children. A detailed outcome space demonstrates how these seven variations are structurally related. (Author s abstract).

Gerber, R. and Kwan, T. (1995) *A phenomenographical approach to the study of pre- adolescents use of maps in a wayfinding exercise in a suburban environment. Journal of Environmental Psychology*, 14: 265-280.

This paper reports the investigative study, which used a phenomenographical approach, on how a group of 12-year-old students found their way around a designated suburban route by referring to a sequential listing of streets along the route and a street directory map of the suburban area. While the content of this study belongs to map use and wayfinding experience of the pre-adolescent students, the approach used is phenomenographic in that it identified the qualitatively

different ways that the students experienced the suburban environment. The students experiences were interpreted using a behavioural matrix of their actions while they traversed the route. Qualitative variations in their approaches to wayfinding using maps were obtained from interviews which were conducted immediately after the students completed their route navigation. Four qualitatively different approaches were determined from their reflections from their reflections of their own wayfinding behaviours. They are the restricted and neophytic approach; careful and sequential approach; deductive and familiarized approach; and the visualized and co-ordinated spatial approach. These approaches reflect the different behaviours and abilities of the students to: plan their route using a street directory map; plan the route street by street or a number of streets at a time; use street signs and other landmarks during the actual task; utilize local knowledge of the route; maintain their orientation; visualize spatial patterns; and use the scale on the map to help planning. (Author s abstract).

Gerber, R., Lankshear, C., Larsson, S. and Svensson, L. (in press) Self-directed learning in a work context. *Education and Training*.

This article addresses the challenge and debate which is currently evident about the nature of learning in workplaces. Relevant research literature seems to place a heavy emphasis on learning in the workplace as being based on methodological aspects or personal attributes of the learners. The study reported here focuses on the importance of the learner and the context in which the learning occurs. It values the importance of workers' experience of learning as being an important basis for understanding what is learned in work-based learning and how it is learned. A phenomenographic approach was used in a study of four types of organisations in Australia. The results of this study consist of six conceptions of self-directed learning. These conceptions saw learning as: personal experience and development, informal training, formal training, offering leadership, instinctive lateral planning, and as a process of quality assurance. (Authors abstract).

Gerber, R., Lankshear, C., Larsson, S. and Svensson, L. (1995) Approaches to learning in a work context. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

Instead of using traditional approaches that focus on the personal or methodological aspects to investigate adult learning in the workplace, this paper focuses on the experiences of workers in specific workplaces to understand how they approach learning on the job. The Australian-based study reported here sought to understand the discourses of 21 white-collar workers' experience of self-directed learning in their workplaces. It was conducted in four different organisations - a large insurance company, a government department, a library and a private educational institution. The participants held varying positions of responsibility within their organisation. A phenomenographic approach was used to conduct the study with interviews as the source of data. The phenomenographic analysis of the data revealed six qualitatively different conceptions of the workers' approach to self-directed learning in their workplaces. In these conceptions, learning was seen to occur through: personal experience and making mistakes; informal discussion with other workers; formal training; offering leadership; open, lateral planning and quality assurance. Implications of these results are discussed. (Author s abstract).

Gerber, R., Ottosson, T., Boulton-Lewis, G., Bruce, C. and Aberg Bengtsson, L. (1993) Towards and understanding of how children understand graphic representations of quantitative data. Paper presented to the 5th EARLI Conference, Aix-en-Provence, France, August 31-September 5.

Children are increasingly being confronted with graphic forms of communication in their learning and daily living. In their formal educational experiences, children encounter a considerable range of graphic representations of data in a qualitative form. Previous research suggests that understanding of how young minds develop an understanding of such representations of data is not a simple process. The phenomenographic approach with its emphasis on a second-order perspective of people s lived experiences is an appropriate mechanism for investigating children s understanding of these graphic forms. Parallel studies, investigating children s understanding of commonly-used graphics that present quantitative information are currently underway in Sweden and Australia. This paper discusses the challenges of undertaking such a study using a phenomenographic approach in two distinctive cultural settings. These challenges relate to language discourse, cultural behaviours, and students thinking. Preliminary insights into the different ways in which students interpret graphics are also reported. (Authors abstract).

Gerber, R., Buzer, S., Worth, C. and Bruce, C. (1992) Is a GIS a GIS? or coming to an experiential understanding of GIS. In R. Gerber (ed.) *Proceedings of the 20th Annual Conference of the AURISA, AURISA: Brisbane*.

The concept of a GIS has been variously interpreted by theorists, practitioners and entrepreneurs. Using a qualitative research approach called phenomenography, it has been possible to determine what university academics and industry professionals in two Australian contexts - Brisbane and Perth - understand by the concept of a GIS. A series of interviews based on structured tasks and open ended questions revealed that the group interviewed possessed a limited number of varying conceptions of a GIS.

Gerber, R., & Velde, C. (1996) Clerical-administrative workers' conceptions of competence in their jobs. *Journal of Vocational Education and Training*, 48(4): 393-404.

A phenomenological analysis was conducted on the written statements that were prepared by 52 people in clerical administrative positions. This non-dualistic investigation revealed five qualitatively different conceptions of competence in clerical administrative workers. These are: competence as the development of basic skills; competence as the possession of essential knowledge about the job; competence as the possession of personal attributes; competence exhibited as an efficient worker; and competence displayed as a flexible, holistic thinker.

Gibbs, G. (1982) A review of the research of Ference Marton and the Goteborg group: a phenomenological research perspective on learning. *Higher Education*, 11: 123-145.

This article reviews the work of Ference Marton and his group of researchers... It describes and explains research into what students learn, how students approach studying ... This article is not a historical account of the development of the work of the Goteborg group. It is a review of the research in order to build up an overall picture of learning as seen from a phenomenological perspective.

Giorgi, A.P. (1986) A Phenomenological Analysis of Descriptions of Concepts of Learning Obtained From a Phenomenographic Perspective. *Fenomenografiska notiser* 4, 1986:18, Institutionen for pedagogik: Gotesborgs Universitet.

An important paper in which Giorgi outlines the difference he perceives between phenomenography and phenomenology. The core of the paper is a phenomenological analysis of data gathered for a phenomenographic investigation into learning. The outcomes of both analysis strategies are similar, although Giorgi claims that there are differences in interpretation (p36) between Säljö and himself.

Gurwitsch, A. (1964) *The Field of Consciousness*. Duquesne University Press: Pittsburgh.

Developing phenomenographic theory is drawing on the notions of consciousness as elaborated by Gurwitsch (see for example Marton's On awareness).

Gustavsson, L., Linell, P. and Säljö, R. (1993) Discourse in language and discourse on language. *International Journal of Educational Research* 19(3): 265-276.

In language lessons, language is not merely the means of communication but also its target. The article reports findings from a study of second language learning among immigrant children (aged 10-12) in the Swedish comprehensive school. The particular focus is on how language is established as the subject of talk in the lesson and how coordination of linguistic activities to refer to language itself is achieved and maintained under such circumstance. The results show that the attitudes to language in the language lesson differ in interesting ways from what is typical in other settings. To establish language as the subject matter, the teacher creates what is referred to as a linguistic enclosure in which the normal communicative function of linguistic expressions is bracketed. It is also shown how this strategy creates difficulties for the student since it presupposes a new and unfamiliar mode of contextualising language. Furthermore, situations frequently arise when the premises for language use will be ambiguous and open for misunderstanding. (Authors abstract).

Halasz, L., Carlsson, M.A. and Marton, F. (1992) Differences in recall and understanding of literary texts read several times, Unpublished manuscript.

One of a series of papers written by the authors about students interpretations of literary texts. Our conclusion is that future studies should aim at clarifying necessary, functional relationships between how texts are read and what is learned from different ways of reading them.

Hasselgren, B., & Beach, D. (1997) Phenomenography - a "good-for-nothing brother" of phenomenology? Outline of analysis. *Higher Education Research & Development*, 16(2): 191-202.

This article will argue that five different ways of doing phenomenography can be found amongst the works of Gothenburg phenomenographers: Discursive, Experimental, Naturalistic, Hermeneutic and Phenomenological. Commenting on an earlier version of phenomenography, Jacob Needleman stated that it was "a 'good-for-noting' brother of phenomenology". We will argue that it is not. It is productive research, even if at times the degree of methodological reflection applied by phenomenographers to their work is found wanting. Two of five forms of Gothenburg phenomenography can be developed by recourse to phenomenology.

Hazel, E., Conrad, L., & Martin, E. (1997) Exploring gender and phenomenography. *Higher Education Research & Development*, 16(2): 213-226.

A critical feature of phenomenographic study is its generation of the "outcome space" which constitutes the results of the study. The central idea underlying this article is that women may be "lost in space" - the phenomenographic outcome space. First, women seem to be literally missing in the majority of phenomenographic studies. These studies have usually been in fields in which women are poorly represented and in research samples in which women have not been present. Second, the traditional disciplines of study, the values of which largely determine the structure of the typically hierarchical outcome space, are patriarchal. Without attention to hidden as well as explicit aspects of what learners are coming to know, the understanding that we gain from the outcome space may be distorted. Third, the outcome space tends to be defined in many studies in cognitive terms, excluding or neglecting the affective dimension often associated with women's ways of knowing. This article explores the implications of looking for and elaborating on women's experience in phenomenographic research and suggests several ways in which women's experience may be recognised: by ensuring that women are included in research; by questioning in gender-sensitive ways; by collecting and analysing the data with attention to the gendered construction of disciplinary knowledge and gendered ways of knowing.

Hasselgren, B. and Marton, F. (1982) Qualitative changes in conceptions of the world around us as an educational outcome: preschool student teachers way of apprehending children at play. *The Australian Journal of Education*, 26(3): 227-246.

Hounsell, D. (1984) Learning and essay writing. In F. Marton, D. Hounsell and N. Entwistle (eds.) *The Experience of Learning*, Scottish Academic Press, Edinburgh.

Hounsell describes the importance of the essay as a learning and assessment activity. He reports a study into history students conceptions of essay writing. In all, three qualitatively different conceptions were identified: argument, viewpoint and arrangement. Further research into essay writing conceptions has been conducted by Mike Prosser (UTS) and reported at the HERDSA 1992 Conference.

Hazel, E., & Prosser, M. (1994) First-year university students' understanding of photosynthesis, their study strategies and learning context. *American Biology Teacher*, 56(5): 274-279.

Provides findings of a study designed to explore ways in which changes in students' conceptual knowledge of photosynthesis are related to their study strategies and achievement and to course content. The authors ask teachers to consider these results and implications when facilitating students' learning.

Hazel, E., Prosser, M., Trigwell, K., & Gallagher, P. (1994) The learning context and students' perceptions. Selected contributions presented at the nineteenth annual national conference and twenty first birthday celebration of the Higher Education Research and Development Society of Australasia, held at the University of New South Wales Sydney, Australia, 2-6 July, 1993. G. Ryan, P. Little and I. Dunn. Campbelltown NSW, Higher Education Research and Development Society of Australasia (HERDSA): 253-258.

The paper explored the relations between students' perceptions of context, approach to learning and outcomes of learning in contrasting learning contexts in physics and biology topics, using as framework a development of the presage-process-product model.

Hegarty-Hazel, E., & Prosser, M. (1986) Students learning of science concepts: photosynthesis and electricity. Theory, Structure and Action in Education: papers of the Annual Conference of the Australian Association for Research in Education, Ormond College, University of Melbourne, November 1986. Melbourne, Australian Association for Research in Education.

Students learning the concepts of photosynthesis and electricity at university level have some everyday experience of the growth of green plants and the use of light and power. Parts of this intuitive knowledge will intertwine with new symbolic knowledge presented by lecturers. This paper examines changes in students conceptual development using the technique of concept mapping over the period from university entry to the end of first year in biology and physics. Changes in terms of definitions, links and branches of concept maps, and the integral structure of the maps, will be described. Further development of this project will be discussed from a phenomenographic perspective.

Hounsell, D. (1987) Essay writing and the quality of feedback. In J. Richardson, M. Eysenck and D. Warren Piper (eds.) *Student Learning: research in education and cognitive psychology*, SRHE and Open University Press: London.

A follow up article to Hounsell's entry in *The Experience of learning*.

Idhe, D. (1986) *Experimental Phenomenology: an Introduction*, 2nd ed. G.P. Putnam's Sons: New York.

Excellent, practical introduction to the phenomenological way of seeing. Takes the reader through a range of exercises in looking at multi-stable phenomena in

order to explain the phenomenological reduction. Highly recommended.

Inglis, A. (1996) Teaching-learning specialists' conceptions of their role in the design of distance learning packages. *Distance Education*, 17(2): 267-288.

This paper describes a phenomenographic study of the conceptions that teaching learning specialists working in distance education in Australian universities hold of their role in contributing to the development of distance education packages. The study identified eight conceptions: instructional editor, educational process consultant, instructional process consultant, transformer, critical reviewer (surrogate student), joint venturer, distance education development facilitator, and staff developer.

Inglis, A. (1992) Tradition and Change in Computer-Based Learning. Occasional Paper 92.1 ERADU, RMIT.

A predominant use of computers in teaching and learning has been for presentation of information - whether verbal, graphic or aural. This assumes an instructional paradigm which regards learning as the acquisition of knowledge through the processing of information. An alternative paradigm interprets learning as a shift in the way of seeing the world as a consequence of experience. Operating from within this paradigm the role of the computer is more accurately described as the creator of experience. As such, it is capable of controlling as well as being controlled by the learner. (Author's abstract).

Johansson, B., Marton, F. and Svensson, L. (1985) An approach to describing learning as change between qualitatively different conceptions. In L. West and A. Pines (eds.) *Cognitive Structure and Conceptual Change*, Academic Press, New York.

Our intention here is simply to describe an approach to the study of learning, developed in more than a decade by our research group. We describe our methodological stance without making explicit comparisons with other approaches. We illustrate our way of reasoning by means of a concrete example and general principles.... In the first part of this chapter we outline our way of seeing learning and in the second part, we elaborate its implications. Discusses at length the nature of conceptions and learning as conceptual change.

Jonsson, L., Linell, P. and Säljö, R. (1991) Formulating the past: remembering in the police interrogation. *Activity Theory*, 9/10: 5-11.

The difficulties encountered in traditional research approaches have to be understood against the background of the Cartesian legacy of a dualist philosophy. When the science of mental life is understood as an autonomous domain of inquiry separate from our daily activities and practical concerns, the problems of delimiting phenomena that are integrated aspects of our social actions become visible, and the attempts to achieve clarity result in abstract conflicts over definitions. The idea behind this paper - and indeed behind the very notion of collective memory as we understand it - is to place remembering not within the heads of individuals but in interaction and discursive practices. Reconstructing the past is seen as a discursive practice situated in a specific context and subject to specific purposes. (p5).

Karlsson, G. (1993) *Psychological Qualitative Research from a Phenomenological Perspective*. Almqvist and Wiksell, Stockholm.

The main purpose of this book is to present, discuss and illustrate a concrete empirical phenomenological psychological method...

Keats, D. (1993) *Skilled Interviewing*, 2nd edition. Hawthorn, Victoria, Australian Council for Educational Research.

Chapter titles include:

1. Psychological bases of interviewing
2. Types of interview
3. Structuring the interview
4. Techniques of interviewing
5. Non-verbal communication
6. Some difficult cases
7. Interviewing children
8. Interviewing the very old
9. Interviewing in situations of emotional stress
10. Interviewing across cultures
11. Interviews as research tools.

Keogh, J. K. (1995) Science students' and science teachers' conceptions of learning. Faculty of Education. Brisbane, Queensland University of Technology.

The aim of this study has been to describe the qualitatively different ways in which a group of science teachers and science students experience or understand learning. A phenomenographic approach was used to elicit the conceptions of learning from the respondents. This involved the analysis of interviews to produce categories of description of the qualitatively different ways in which learning is experienced. Seven categories of description of the phenomenon 'learning' resulted from the phenomenographic analysis of the interviews. Five categories were common to teachers and students and were: learning is seen as 'knowledge acquisition', 'memorisation and recall of knowledge', 'utilisation of knowledge', 'understanding and meaning development' and as 'personal development through life experiences'. Two conceptions were found to be peculiar to the teachers: learning is seen as 'the internal structuring of knowledge' and as 'an interpretive process aimed at reality construction'. The first four conceptions of learning, as listed above, are isomorphic with those identified in other phenomenographic studies. The categories, 'learning is seen as personal development through life experiences' and 'as an interpretive process aimed at reality construction', were found to have major features in common with categories described in other phenomenographic studies. The category, 'learning is seen as the internal structuring of knowledge', was not, to this researchers' knowledge, found in the results of previous phenomenographic studies. The outcomes of this research - the identification of the seven categories of description and the logical relationship between them - can be utilised by those involved in education to reflect on and examine the conceptions of learning in their domain. By understanding the range of conceptions of learning that may be involved in the interaction between teachers, students and the program of instruction, it is possible for changes to be made to the learning environment that may improve the quality of learning of all those involved.

Keogh, J., Cook, A. and Bruce, C. (1994) Science students and science teachers conceptions of learning. In R. Ballantyne and C. Bruce (eds.) *Phenomenography: Philosophy and Practice*. Proceedings. QUT, Brisbane, Australia, pp. 229-243.

This study was conducted in a State High School in Brisbane, Australia. The paper presents the results of the inquiry into qualitatively different ways in which a group of science teachers and students reported their experience of learning.

Kumlin, I. W., & Kroksmark, T. (1992) The first encounter: physiotherapists' conceptions of establishing therapeutic relationships. *Scandinavian Journal of Caring Sciences*, 6(1): 37-44.

The purpose of this study was to delineate physiotherapists' conceptions of establishing therapeutic relationships with patients and conceptions of activating the resources of the patients. Ten physiotherapists were interviewed about their ways of thinking and performing in the first encounter with the patient. The phenomenographic method was used and data were analysed qualitatively. Different categories of conceptions with reference to the preparations before the encounter, the proceeding of the encounter and the strategy within the encounter were found. Two main perspectives on the relationship between the physiotherapist and the patient were seen. One is that the relationship is based on a dialogue which aims to discover the patient's own conceptions of his problems and strategies to solve them. The second perspective is that the relationship is not based on a dialogue but that the physiotherapist perceives herself as authority. The physiotherapists' knowledge and understanding of establishing relationships with their patients can be described as personal, private and non-thematic.

Kvale, S. (1995) The social construction of validity. *Qualitative Inquiry*, 1(1): 19-40.

Validation of qualitative research is here discussed in relation to postmodern conceptions of knowledge. A modernist notion of true knowledge as a mirror of reality is replaced by a postmodern understanding of knowledge as social construction. Of the common psychometric concepts of validity, predictive validity is related to a modernist correspondence theory of truth, whereas construct validity may be extended to encompass a social construction of reality. Three approaches to validity are outlined in some detail. First, validity is treated as an expression of craftsmanship, with an emphasis on quality of research by checking, questioning and theorizing on the nature of the phenomena investigated. Second, by going beyond correspondence criteria of validity, the emphasis on observation is extended to include conversations about observations, with a communicative concept of validity. Third, by discarding a modern legitimization mania, justification of knowledge is replaced by application, with a pragmatic concept of validity. In conclusion, the validity of the validity question is questioned.

Kvale, S. (1989a) To validate is to question. In S. Kvale (ed.) *Issues of Validity in Qualitative Research*. Studentlitteratur, Lund.

The issue of valid knowledge in qualitative research is pursued in three directions: a questioning of the subject matter investigated, a questioning of the concept of true knowledge, and finally a questioning of the validity question. First an overview of approaches to validity in current social science research is presented and then related to philosophical conceptions of truth.

Kvale, S. (ed.) (1989b) *Issues of Validity in Qualitative Research*. Studentlitteratur, Lund.

Within the last few years the issue of validity in qualitative research has come to the fore. The present volume reflects this emerging concern. The volume does not provide a systematic overview of the many different concepts of validity...rather specific issues of validation are discussed. Contributions by Kvale, Polkinghorne, Salner, and others. Highly Recommended.

Kvale, S. (1987) Validity in the qualitative research interview. *Methods*, 1(2): 37-42.

Kvale, S. (1983) The qualitative research interview - a phenomenological and a hermeneutical mode of understanding. *Journal of Phenomenological Psychology*, 14: 171-196.

Kwan, T. and Gerber, R. (1995) Asian migrant students' experiences of using maps to find their way around suburban Australian streets. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

This paper reports the investigative study, which used a phenomenographic approach, of how a group of recently-migrated 12 - 15 year old students found their way around a suburban area using a street directory map. While the content of this study belongs to map use and the wayfinding experience of students for whom English is the second language, the approach used is phenomenographic. Here, the qualitatively different ways in which the students used maps to find their way around a suburban environment were identified. The students' experiences were captured using a behavioural matrix of their actions during the wayfinding task and reflective interviews obtained immediately after completion of the task. Four qualitatively different approaches were revealed from the students' experience of wayfinding. They are: a restricted neophytic approach; a careful, sequential approach; a deductive, familiarized approach; and a visualized, coordinated spatial approach. (Author's abstract).

Landbeck, R. and Mugler, F. (1994) Approaches to study and conceptions of learning of students at the USP, Report, University of the South Pacific.

Reports a study into linguistics students experiences of learning at USP. Data was gathered through the use of interviews, written responses and a study inventory.

Larsson, S.C. (1995) White-collar workers conceptions of learning for work - the role of the wider context. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

This paper is an presentation of some of the preliminary results of a three-year project called 'Self-directed learning in a work context'. There are two underlying assumptions in this project. The first is, that when studying individuals' learning at work, individuals should be regarded as whole humans with former experiences and with ideas of the future. That is to say, the 'task for the day' is not the only thing to be interested in, if you want to understand how people think about the possibilities to learn and develop skills at work. The individuals' engagement in the profession and ambition with the employment as a part of life is conceived to be important too. Secondly, the worker should not be seen as a holder of well-defined pieces of competence, obtainable for easy manipulation by management, educators etc. Instead, the study advocates an non-rationalistic approach where the individuals' way of conceiving the work will come in focus. Education, self-directed learning, learning by doing etc. are regarded as important ingredients by others in a person's development of skills and knowledge. In the study these different ingredients are not analyzed per se. Instead, the focus is on the individual's own conception of these ingredients in relation to what is said above. The same view regards the relation between the employee and the possibilities or hints the organisation and the management may offer in terms of learning and development. The study described is an interview study, with a phenomenographic approach, with sixty Swedish white-collar workers from ten different types of companies and organisations. Some of the preliminary results will be presented in the paper. (Author's abstract).

Larsson, S. (1986) Learning from experience: teachers conceptions of changes in their professional practice. *Journal of Curriculum Studies*, 9(1): 35-43.

One of the first publications in the phenomenographic journal literature about teachers conceptions of teaching, as opposed to learners conceptions of learning.

Laurillard, D. (1993) *Rethinking University Teaching: a Framework for the Effective Use of Educational Technology*. Routledge, London.

Lybeck, L., Marton, F., Stromdahl, H. and Tullberg, A. (1988) The phenomenography of the mole concept in chemistry. In P. Ramsden (ed.) *Improving Learning: New Perspectives*, Kogan Page, London.

The study we describe below depicts the qualitatively different ways in which secondary school students think about and deal with the mole concept or, more correctly, about the quantity amount of substance and its SI unit the mole (p81). The chapter presents a detailed description of a rigorous phenomenographic investigation, as well as an extended discussion of results.

Lyons, F., & Prosser, M. (1995) **Qualitative differences in student learning of electrical phenomena. Research into Higher Education: Dilemmas, Directions and Diversions.** C. McNaught and K. Beattie. Bundoora Vic, Higher Education Research and Development Society of Australasia (HERDSA), Victorian Branch: 83-90.

The aim of this study was to identify qualitatively different categories of description of student understanding of the phenomenon in the subject they were studying. The authors describe how data was collected and the analysis performed. The focus is on student understanding of electrical phenomenon in first year university physics in two NSW universities. Students were pre and post tested through questions and a concept map.

Martensson, J., Karlsson, J., & Fridlund, B. (1997) **Male patients with congestive heart failure and their conception of the life situation."** *Journal of Advanced Nursing*, 25(3): 579-586.

Patients with congestive heart failure (CHF) are an extensive group in Sweden both with regard to prevalence and number of medical care events. As the age of the population and survival after myocardial infarction are increasing, the incidence of CHF is also on the rise. The aim of this study is to describe, from a nurse's perspective, how male patients with CHF conceive their life situation. Interview questions were designed with a focus on five dimensions: the biophysical, the socio-cultural, the emotional, the intellectual, and the spiritual-existential. A qualitative method was used with a phenomenographic approach as it examines aspects of the surroundings as conceived. In the results, six categories emerged: feeling a belief in the future, gaining awareness, feeling support from the environment, feeling limitation, feeling a lack of energy and feeling resignation. The mental and physical lack of energy which patients feel easily leads to limited working capacity and social activities. This limitation may cause patients with CHF to believe that neither they nor their environment can influence their life situation and there is a risk that these patients become resigned. In order to help them get out of this vicious circle of limitation and resignation, it is important that the nurse teaches them self-care and shows them the possibilities that exist in everyday life. With increased awareness of their life situation, patients may adapt to their CHF and see that it is possible to improve their future themselves.

Martin, E., Prosser, M., Benjamin, J., Trigwell, K., & Ramsden, P. (1995a) **Teaching the same, but differently: variation in understanding of the topic being taught in a team-teaching classroom.** *Research and Development in Higher Education*, 18: 514-519.

This paper reports a pilot study examining relationships between characteristics of academic departments and the quality of university teaching and learning. Although the main project focuses on differences common across different fields it is recognised that the culture of a discipline has a considerable influence on how teaching is perceived and organised.

Martin, E., Prosser, M., Benjamin, J., Trigwell, K., & Ramsden, P. (1995b) **Perceptions of leadership and management in the teaching of large first year university courses.**

Unpublished paper presented at the Annual Conference of the Australian Association for Research in Education (AARE), Hobart Tas 27-30 November 1995.

McCosker, H.M. (1995) **Women s conceptions of Domestic Violence during the childbearing years. Master of Nursing Dissertation, Queensland University of Technology, Faculty of Health, School of Nursing, Brisbane.**

Domestic violence against women during pregnancy as been predominately explored through the use of numerical data, and has ignored the voices of the women experiencing this phenomenon. This dissertation explores the phenomenon of domestic violence during the childbearing years through a phenomenographic methodology. Transcripts of interviews with six women who had completed a "Freedom from Violence" course were analysed to reveal their collective conceptions of the experience of domestic violence. Three conceptions were identified: domestic violence is experienced as being controlled, domestic violence is experienced as destruction and domestic violence is experienced as loss of self.

McCosker, H. (1994) **Phenomenographic interview applied to women and domestic violence: potential conflict of interest.** In R. Ballantyne and C. Bruce (eds.) *Phenomenography: Philosophy and Practice. Proceedings.* QUT, Brisbane, Australia, pp. 299- 306.

This paper discusses the application of the phenomenographic interview to a sensitive issue: abuse and pregnancy. Similarities and differences between the therapeutic and research interview including the purpose, expectations and role of the interviewer are discussed. (Adapted from author s abstract). This paper became pivotal to discussion of the data gathering process and feminist issues during the conference, being regularly referred to by subsequent speakers.

McCracken, J. (1995) **Implications of phenomenographic study for instructional design: A study in geological mapping. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.**

Instructional design as a professional practice seeks to prescribe methods and strategies for organizing and presenting materials for a particular instructional situation. The analysis carried out, which drives the decisions regarding which methods and strategies to apply, focuses on developing a set of instructional requirements in the form of objectives, content structures, and learner characteristics. The main methodology employed to acquire information for determining these requirements is an iterative set of interviews with subject matter experts or teachers. In contrast, phenomenographic studies employ a rigorous methodology for studying students in order to discover qualitatively distinct ways in which students conceptualize a particular topic they are attempting to learn. One can consider this methodology as a special learning needs analysis, the results of which provide the designer with a precise descriptions of students' conceptions and the kinds of approaches to learning students employ. This paper reports on the results of a three-stage research effort; a phenomenographic study of students learning to interpret geological maps, the design of learning materials which integrated the results of the first study, and an evaluation of learning outcomes carried out with students who used the learning materials. (Author s abstract).

Martin, E. (1994) **Variations in awareness.** EQARD Occasional paper 94.1, RMIT, Melbourne, Victoria.

This paper represents a development from previous phenomenographic studies focussing on conceptions of teaching and learning to a focus on awareness. The study reported examines teaching and learning in two first year courses that teach creative writing. When we examine what lecturers in these subjects believe the topics to be about, and how students are helped to understand them, we see different interpretations of what creative writing is and what it takes to learn it as an academic subject.(p.1)

Martin, E. and Balla, M. (1991) *Conceptions of teaching and implications for learning. Research and Development in Higher Education*, 13. Papers presented at the 13th annual HERDSA Conference at Griffith University 6th - 9th July 1990. Bob Ross (ed.) HERDSA: Sydney.

As the title indicates this paper reports university teachers conceptions of teaching. The conceptions identified are not identical with those found by Dall Alba in her study reported at the same conference.

Martin, E., Bowden, J. and Ramsden, P. (1990) *Students Conceptions of Adaptation to Higher Education. Occasional Paper 90.2. ERADU: RMIT.*

In this paper we describe important differences in the ways in which students adapt to learning in higher education... Fifty three students were interviewed in first year, thirty two of these same students were interviewed at the end of their second year.... Students were asked the same question in both years: How do you feel you have adapted from learning at school to learning in higher education? The development of students' perceptions is traced over the two years.

Martin, E. and Milton, J. (1992) *Role of the Computer in the Teaching of Design. Occasional Paper 92.3., Educational Research and Development Unit, RMIT.*

This study identifies ways of looking at computers as held by design educators. Five categories of description are the outcomes:

- Category A: Basic computer skills
- Category B: A tool for producing a graphic image
- Category C: An additional graphic technique
- Category D: An aid to seeing an image differently
- Category E: An aid to visual problem solving

The scheme is hierarchical with each successive conception incorporating earlier ones.

Martin E. and Ramsden, P. (1986) Do learning skills courses improve student learning? In J. Bowden (ed.) *Student Learning: Research Into Practice - the Marysville Symposium*, CSHE, University of Melbourne.

The authors present a study aimed at changing first year tertiary students' conceptions of learning. Another paper examining what phenomenographic research and its outcomes can offer.

Marton, F. (in press) *Cognosco Ergo Sum. Nordisk Pedagogik.*

Some of the critique of phenomenography appearing in this series is commented on and responded to. In relation to the most fundamental question raised it is argued that the basic unit of phenomenography is experiential, non-dualistic, an internal person-world relationship, a stripped depiction of capability and constraint, non-psychological, collective but individually and culturally distributed, a reflection of the collective anatomy of awareness, inherent in a particular perspective. (Author's abstract).

Marton, F. (1994a) On the structure of awareness. In J. Bowden and E. Walsh (eds.) *Phenomenographic Research: Variations in Method*. EQARD, RMIT.

This is a key paper examining some important ontological issues in relation to the phenomenographic approach. Includes sections dealing with

1. the non-dualistic nature of phenomenography
2. What is a phenomenon?
3. The nature of awareness.

Some scholars may wish to consult the original manuscript dated 1/6/1993 for minor variations.

Marton, F. (1994b) On the structure of teachers' awareness. In I. Carlgren, G. Handale, S. Vaage (eds.) *Teachers' minds and actions. Research on teachers' thinking and practice*. London: Falmer Press.

Marton, F. (1994) Phenomenography. In T. Husen and T.N. Postlethwaite (eds.) *International Encyclopaedia of Education*. Oxford: Pergamon Press.

A review of the development of phenomenography. Includes sections on origins, the object of research, experience, awareness and methods.

Marton, F. (1993) Our experience of the physical world. *Cognition and Instruction*, 10(28.3): 227-38.

This is a commentary responding to Andrea de Sessa's monograph *Toward an Epistemology of Physics*. In this short commentary Marton makes clear his rejection of the cognitivist approach, that is the presumption that all psychological explanations must be framed in terms of internal mental representations and processes (or rules) by which these representations are manipulated and transformed (p233).

Marton, F. (1992a) The phenomenography of learning: a qualitative approach to educational research and some of its implications for didactics. *Learning and Instruction* 2(1): 601-616.

A brief overview of phenomenography as applied to learning. Reviews research into different conceptions of learning and restates the nature of phenomenography. The main message is about two distinctive interpretations of the phrase the phenomenography of learning.

1. as the study of the different ways in which learning is conceptualised
2. as studying learning as a change between qualitatively different conceptions of one and the same phenomenon.

The latter seems very close to Bowden's phenomenographic pedagogy. Marton draws on Dagmar Neuman's research into children's conceptions of number relations for illustration.

Marton, F. (1992b) Notes on ontology, Manuscript published as Searching for a pedagogy of awareness. *Forskning om utbildning*, 19(4): 28-40.

An important paper analysing theoretical assumptions in relation to the non-dualist position and the nature of a phenomenon. Includes an extended section on

awareness. This paper specifies that in phenomenography the concepts of conception, experience, understanding, perception etc all refer to the underlying subject object relation. In this paper Marton also describes the outcome space as representing the phenomenon.

Marton, F. (1990) The phenomenography of learning - a qualitative approach to educational research and some of its implications for didactics. In H. Mandl, E. De Corte, N. Bennet and H. F. Friedrich (eds.) *Learning and instruction in an international context*. Oxford, Pergamon. 2: 605-616.

Marton, F. (1989) Towards a pedagogy of content. *Educational Psychologist*, 24(1): 1-23.

The relation between educational research and educational practice is examined from the point of view of the content of learning and teaching. The line of reasoning is framed in terms of four seemingly contradictory propositions. This paper would be of interest to those interested in using phenomenographic research to improve teaching practice.

Marton, F. (1988a) Phenomenography: exploring different conceptions of reality. In D. Fetterman (ed.) *Qualitative Approaches to Evaluation in Education: the silent revolution*. New York: Praeger.

An important exposition of many key aspects of phenomenography, including its development and what are now regarded as the three lines of phenomenographic research. Also compares and contrasts phenomenography with ethnography and phenomenology. This paper deals only with the work of the Gothenrg kernel group, it does not examine British or Australian work in the area.

Marton, F. (1988b) Describing and improving learning. In Ronald Schmeck (ed.) *Learning Strategies and Learning Styles*, Plenum Press: New York.

This paper examines the relational aspect of learning with particular emphasis on the notions of structure and reference. It is possibly one of the least easy to read of Marton papers but may be regarded as one of the more important. Concludes with a section on learning as conceptual change and one on a relational view of learning. The notion of a relational view of learning also appears in Ramsden Improving Learning: New Perspectives.

Marton, F. (1988c) Phenomenography and "the art of teaching all things to all men". Fenomenografiska notiser 8. Institutionen for pedagogik. Goteborgs universitet.

Each phenomenon in the world around us can be seen and understood in only a limited number of distinctively different ways. According to the research specialisation named phenomenography, the various understandings are experiential relations between individual and phenomenon. It is suggested that changes between such understandings constitute the most important form of learning. In order to characterize teaching methods in a reasonably precise way we have to specify the kind of learning and understanding the teaching methods are aimed at bringing about. And in order to develop teaching methods which are reasonably effective in bringing about changes in the understanding of various phenomena, we have to start by revealing the nature of the actual differences in the understanding of those phenomena. Consequently, teaching methods have to be characterised and developed in relation to each phenomenon taught about.

Marton, F. (1986a) Some reflections on the improvement of learning. In J. Bowden (ed.) *Student Learning: Research into Practice - the Marysville Symposium*. CSHE, University of Melbourne.

Marton stresses the relational character of learning, ie. learning is always the learning of something. This paper responds to the following questions: Can we not make theoretical generalisations about learning? Does research have to be descriptive - can we not draw any predictive or prescriptive conclusions from it? What is the use of phenomenographic research?

Marton, F. (1986b) Phenomenography - a research approach to investigating different understandings of reality. *Journal of Thought*, 21(3): 28-49.

This paper is an updated version of Marton 1981 paper in Instructional Science. Deals with the historical development of phenomenography and Marton perception of its relationship with phenomenology. Essential reading.

Marton, F. (1984) Towards a psychology beyond the individual. In K.M.J. Lagerspetz and P. Niemi (eds.) *Psychology in the 1990 s*, Elsevier: Netherlands.

The point of departure is an assumption that psychology in the future has to go beyond the single individual and as one of its main tasks, will involve the analysis and description of the distinctively different ways in which human beings relate themselves to various aspects of their world. Examines phenomenography in relation to phenomenology. Includes a section on conceptions and categories of description. Defines conceptions as man-world relations (p61). Points to noema and noesis as being equivalent to the what and the how of phenomenography. An important theoretical paper.

Marton, F. (1981a) Phenomenography - describing conceptions of the world around us. *Instructional Science*, 10: 177-200.

A seminal paper outlining phenomenography as a research approach. Deals with the research questions which phenomenography may appropriately illuminate. Focuses on the importance of researching the second-order perspective. Describes categories of description as denoting a collective intellect. Also examines the relationship of phenomenography with phenomenology. Essential reading.

Marton, F. (1981b) Studying conceptions of reality - a metatheoretical note. *Scandinavian Journal of Educational Research*, 25(4): 159-169.

It is argued that descriptions of the qualitatively different ways in which people experience and understand various aspects of reality make up an autonomous field of inquiry. Marton compares the work of Piaget with phenomenography, suggesting that Piaget's initial research was very much akin to the work of phenomenography. A departure occurs when Piaget shifts from describing the world as it is seen by the child to describing the child as he/she is seen by the researcher. At this point, in Piaget's work, the experiential perspective is lost.

Marton, F. (1976) On non-verbatim learning 11. The erosion effect of a task-induced learning algorithm. *Scandinavian Journal of Psychology* 17: 41-48.

One of a series of early papers from which the phenomenographic approach evolved. This paper takes a strong experimental psychology approach.

Marton, F. (1975) On non-verbatim learning 1. Level of processing and level of outcome, *Scandinavian Journal of Psychology*, 16: 273-279.

One of the earliest papers in the development of the phenomenographic approach.

Marton, F., & Booth, S. (1997) *Learning and awareness*. Mahwah, NJ, Lawrence Erlbaum.

Marton, F., & Booth, S. (1996) The learner's experience of learning. In D. R. Olson and N. Torrance (eds.) *The Handbook of Education and Human Development*. Oxford, Blackwell: 534-564.

Marton, F., Carlsson-Asplund, M. and Halasz, L. (1994) The reverse effect of an attempt to shape reader awareness. *Scandinavian Journal of Educational Research*, 38:291-298.

Marton, F., Dall'Alba, G., & Tse, L. K. (1996) Memorizing and understanding: the keys to the paradox? In D. A. Watkins and J. B. Biggs (eds.) *The Chinese Learner: Cultural, Psychological and Contextual Influences*. Hong Kong, Faculty of Education, University of Hong Kong: 71-83.

This chapter explores the ways in which learning is understood by a group of Chinese teacher educators and the extent to which memorisation features in these conceptions. It also examines how this group conceives understanding, memorising and meaning, with a view to a more adequate solution of the paradox of the Chinese learner.

Marton, F., Fensham, P. and Chaiklin, S. (1994) A Nobel s eye view of scientific intuition. *International Journal of Science Education*, 16:457-473.

Marton, F., Dall Alba, G. and Beaty, E. (1993) Conceptions of learning. *International Journal of Educational Research*, 19(3): 277-300.

Explores the view of learning held by students in a Social sciences Foundation course at the Open University. Of the six conceptions discovered, the first five are identical to those found by Säljö in earlier studies(p.283-284):

1. Increasing one s knowledge
2. Memorizing and reproducing
3. Applying
4. Understanding
5. Seeing something in a different way
6. Changing as a person

Individuals participating in the study are also investigated as cases for stability and development .

Marton, F., Dall Alba, G. and Tse, L.K. (1993) *The Paradox of the Chinese Learner*. Occasional Paper 93.1 ERADU - RMIT.

In this paper we explore the ways in which learning is understood by a group of Chinese teacher educators and the extent to which rote learning features in these conceptions. We also examine how this group conceives of understanding, memorising and meaning, with a view to a more adequate solution of the paradox of the Asian learner. (p2).

Marton, F., Carlsson, M.A. and Halasz, L. (1992) Differences in understanding and the use of reflective variation in reading. *British Journal of Educational Psychology*, 62: 1-16.

This study differs from Marton s earlier studies on student learning from texts, in that it asks how students interpret a parable, and gathers written data on a number of occasions from the same students for analysis. The study was conducted in Swedish and Hungarian schools. For those who may find reading studies on conceptions of scientific concepts a little stretching this one makes a refreshing change. It is easy to read and the phenomenographic approach emerges clearly through the progression of the article.

Marton, F. and Dahlgren, L.O. (1976) On non-verbatim learning III. The outcome space of some basic concepts in economics. *Scandinavian Journal of Psychology*, 17: 49-55.

Another early paper in the development of the phenomenographic approach. The notions of outcome space and categories of description are present in their earliest forms.

Marton, F., Hounsell, D., & Entwistle, N. (Eds.) (1997) *The experience of learning : implications for teaching and studying in higher education*. Edinburgh, Scottish Academic Press.

Contents: Noel Entwistle: Contrasting perspectives on learning; Lars-Owe Dahlgren: Learning conceptions and outcomes; Ference Marton and Roger Säljö: Approaches to learning; Lennart Svensson: Skill in learning and organising knowledge; Liz Beaty, Graham Gibbs and Alistair Morgan: Learning orientations and study contracts; Roger Säljö: Reading and everyday conceptions of knowledge; Dai Hounsell: Contrasting conceptions of essay-writing; Diana Laurillard: Styles and approaches in problem-solving; Noel Entwistle and Abigail Entwistle: Revision and the experience of understanding; Vivien Hodgson: Lectures and the experience of relevance; Diana Laurillard: Learning formal representations through multimedia; Charles Anderson: Enabling and shaping understanding through tutorials; Paul Ramsden: The context of learning in academic departments; Alistair Morgan and Liz Beaty: The world of the learner; Dai Hounsell: Understanding teaching and teaching for understanding.

Marton, F. and Neuman, D. (1990) *The Perceptibility of Numbers and the Origin of Arithmetic Skill*, Report 1990:05. Department of Education and Educational Research. University of Goteburg.

There is a generally agreed view of the development of arithmetic skills which suggests that children start by modelling simple addition and subtraction problems physically... An empirical study of 82 Swedish school starters yields results that seriously challenge this view of the development of arithmetic skills The aim of this study was to identify the different ways in which children experience the numbers, and number relations 1 - 10. Twelve qualitatively different ways of experiencing numbers were found, logically related and presented in an outcome space. The number of conceptions is far greater than those previously found in phenomenographic studies.

Marton, F. and Neuman, D. (1989) Constructivism and constitutionalism. Some implications for elementary mathematics education. *Scandinavian Journal of Educational Research*, 33(1): 35-45.

Our aim in this paper has been to compare the constructivist paradigm with an alternative framework, here called constitutionalism. Above all we wanted to show how certain differences appear in views on the development of arithmetic skills.....The constructivist paradigm puts an emphasis on the individual s acts, while within a constitutional framework we are primarily interested in how various aspects of the world are seen by different individuals . Is Marton arguing that

phenomenography and a constructivist approach are incompatible and if so what are the implications?

Marton, F. and Ramsden, P. (1988) What does it take to improve learning? In P. Ramsden (ed.) *Improving Learning: New Perspectives*. London: Kogan Page, pp. 268-286.

This chapter continues the theme of improving learning by taking a different approach to teaching. That is learning must be seen as changing conceptions of subject matter within a learning context. Aspects of a relational view of learning (p272), desirable conceptions of teaching (p276) and teaching strategies for conceptual change learning (p277) are also discussed. Concludes with a discussion of implications for educational research of such a view of teaching and learning.

Marton, F., Runesson, U., Prosser, M., & Trigwell, K. (1997) Teaching and learning science: teachers' conceptions of problem solving in university science courses. 7th EARLI Conference, 26-30 August 1997, Athens.

Marton, F. and Säljö, R. (1984) Approaches to learning. In F. Marton, D. Hounsell and N. Entwistle (eds.) *The Experience of Learning*, Edinburgh: Scottish Academic Press.

Describes the early studies on students reading texts. Represents a synthesis of the early development of the phenomenographic approach. Contains a description of the analysis procedure (p. 38-39) which is virtually identical to that described again by Marton in his 1988 paper: Phenomenography: exploring different conceptions of reality. Important reading to anyone interested in using phenomenography to describe student learning.

Marton, F. and Säljö, R. (1976) On qualitative differences in learning: 1-outcome and process. *British Journal of Educational Psychology* 46: 4-11.

This paper represents some of the earliest publication in journals of research results from the phenomenographic approach. The aim of the paper is to provide an outline of the experimental procedure adopted in a series of studies reported in more detail elsewhere (Marton 1975, Dahlgren 1975, and Säljö 1975). Despite the emphasis on the qualitative, the notion of experimental procedure still reflects the traditional approach to quantitative research.

Marton, F. and Svensson, L. (1979) Conceptions of research in student learning, *Higher Education* 8(4): 471-486.

Differences in approaches to research into student learning are analysed in terms of differences in the conception of six aspects of the research process.

Marton, F., Watkins, D. A., & Tang, C. (1997) Discontinuities and continuities in the experience of learning: an interview study of high school students in Hong Kong. *Learning and Instruction*, 7(1): 21-48.

An interview study was carried out with 43 high-school students with the dual aim of a) exploring the dimensionality of learning; and b) investigating the nature of the relationship between memorisation and understanding as experienced by Chinese learners. The different ways of experiencing learning found in the group participating in the investigation are described within two-dimensional outcome space. There is a temporal dimension of variation, comprised of "acquiring", "knowing" and "making use of". The other dimension is that of depth, ranging over seeing learning as "committing words to memory", "understanding meaning" and "understanding phenomena". Concerning the second question this study sets out to illuminate some of our findings point to the possibility of the experience of understanding being developmentally preceded by, and differentiated from, the experience of committing to memory. In the context of similar studies carried out in other cultures, this investigation contributes to our understanding of an evolving culturally distributed universal structure of conceptions of learning grounded in overlapping and complementary views.

Marton, F., Watkins, D. and Tang, C. (1995) Continuities and discontinuities in the experience of learning: an interview study of high school students in Hong Kong. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

In an interview study carried out with 43 high school students in Hong Kong it was found that the variation in their views of learning could be described in terms of the crossing of two dimensions. One dimension refers to the temporality of learning as experienced. Although they are interwoven we can analytically separate three facets in the students' accounts: acquiring what is learned, knowing it (having it stored somehow), and subsequently making use of it (applying). The other dimension refers to the depth of learning. The students' experiences vary from a primary stress on the retentional aspect (memorizing), the meaning aspect (understanding), or the referential aspect (grasping the phenomenon which is being learnt about). Further discriminations are made within and in addition to the nine combinations of categories within these two dimensions and some findings supposedly typical for Chinese learners (such as the experienced interrelatedness of the retentional and meaning aspects of learning) will be reported. (Author's abstract).

Marton, F., Wen, Q., & Nagle, A. (1997 (in press)) Views on learning in different cultures : comparing patterns in China and Uruguay. Are Culturally Different Conceptions of Learning Conflicting or Complementary to each other? A Comparative Study of Chinese and Uruguayan University Students. *Anales de Psicologica*.

Marton, F., Wen, Q. and Nagle, A. (1995) Are culturally different conceptions of learning conflicting or complementary to each other? - A comparative study of Chinese and Uruguayan university students. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

This paper reports findings from a comparative study of Chinese and Uruguayan students' conceptions of learning. The results were obtained by re-analyzing the interview data of two independent studies. Our analysis of the data was undertaken in line with the general framework proposed by Marton (1994), in which culturally different conceptions of learning are structured along two dimensions, i.e. the temporal dimension (acquiring-knowing- applying) and depth of learning (surface-deep). The results showed that both Chinese and Uruguayan students emphasized the acquiring phase of learning and furthermore they shared the view that learning was always initiated by something being acquired from the outside. However, almost none of the subjects explained how they went about the initial action of learning. Their conceptions appeared to be opposite in many cases but actually they were complementary to a large extent once we put their different conceptions in the aforesaid framework. The Chinese students tended to emphasize the on-going aspect of learning while the Uruguayan students tended to focus on permanently keeping the knowledge within themselves. The Chinese students singled out the action of committing what they have read or told to their memory as one step of learning, while the Uruguayan students did not think such a conscious action was necessary because keeping things in the memory was regarded as a natural product of learning. The Chinese students placed more emphasis on outer behaviors such as repeated practice, whereas the Uruguayan students stressed inner acts such as assimilating, incorporating and self-experiencing. Finally, the Chinese students identified two kinds of memorization, mechanic and meaningful, which are interrelated with understanding, while the Uruguayan students simply equated memorization with rote learning and regarded it as being the opposite of understanding. (Author's abstract).

Marton, F. and Wenestam, C. (1988) Qualitative differences in retention when a text is read several times. In M.M. Gruneberg, P.E. Morris and R.E. Sykes (eds.) *Practical Aspects of Memory: Current Research and Issues*. Wiley: New York.

Eight subjects read a prose passage of high complexity several times. The findings clearly indicate that repetition per se is not sufficient for increased understanding of the text. Due to differences in the approaches adopted to the task, comprehension improved, deteriorated or remained unchanged.

Massey, G. (1996) Linking CD-ROM information resources with information literacy: the role of secondary students. Beyond the Horizon: conference proceedings, fourteenth biennial Conference of the Australian School Library Association, Esplanade Hotel Fremantle, Western Australia 1-5 October 1995, West Perth WA: Australian School Library Association (ASLA).

This is a discussion on the use of CD-ROM as an information resource available to high school students and the role of the teacher librarian in providing this resource.

Massey, G. (1995) *Seven conceptions of CD-ROM information resources*. Faculty of Education. Brisbane, Queensland University of Technology.

Students' experiences of CD-ROM information resources to gain access to information they require in their daily lives, either in the context of their school work or their personal information needs, may influence the development of crucial information skills. Previous research into CD-ROM information resources and their use by students has adopted a first-order perspective. That is, it has looked at technical aspects of the design of CD-ROM information resources; the effectiveness of CD-ROM information resources; and the observed use of CD-ROM information resources. This study adopts a second-order perspective to investigate students' experiences of CD-ROM information resources from the students' point of view. Such a perspective emphasises the non-dualistic nature of the relationship that exists between students and CD-ROM information resources. Seven conceptions of CD-ROM information resources were discovered. Participants saw CD-ROM information resources as emerging technological resources, as terra incognita, as the future of information, as tools, as information silos, as learning media and as limited information resources. The structural relationship that exists between the conceptions was found to be dependent on the degree to which CD-ROM information resources were seen either to facilitate or not to facilitate physical or intellectual access to information. A comparison of the participants' conceptions with the 'authorized' conceptions revealed that six of the seven conceptions were held by both the participants and the experts in the field. This comparative rate helps to validate this study. The reliability of the findings was confirmed by the use of a cojudge who scrutinized a sample of the data to allocate selected quotations to the categories chosen to describe the conceptions. A high interjudge reliability rate was achieved. The study shows how teachers and teacher-librarians can use a knowledge of the conceptions discovered to introduce students to different ways of experiencing CD-ROM information resources. These different experiences may help to promote the development by students of the information skills so necessary for students to participate actively in the information age, now and in the future.

McSorely, J. (1996) Primary school teachers' conceptions of teaching art criticism. *Studies in Art Education*, 37(3): 160-169.

Utilizes a phenomenographic (study of the world as it is conceptualized) qualitative study to ascertain art teachers' attitudes towards teaching art criticism. Categorizes six conceptions of teaching art criticism and includes a description and interpretation of each. Discusses the limitations of these approaches and the implications for teacher education.

Meyer, J. H. F. (1995) A quantitative exploration of conceptions of learning. Higher education: blending tradition and technology: proceedings of the 1995 Annual Conference of the Higher Education Research and Development Society of Australasia (HERDSA), Rockhampton Qld: Central Queensland University. Professional Education Centre.

Phenomenographic studies have suggested that students vary in terms of their conceptions of learning. A broad distinction is made between conceptions of learning that are accumulative in nature and those that are transformational. This quantitative study investigates the empirical structure of conceptions of learning.

Morgan, A. (1993) *Improving Your Students Learning: reflections on the experience of study*. Kogan Page: London.

This very readable text draws together much research from the phenomenographic school into student learning. It includes chapters on What is learning? How do students go about their studies? What are students supposed to learn? and How do students change and develop?

Mugler, F. and Landbeck, R. (1997) Learning in the South Pacific and phenomenography across cultures. *Higher Education Research & Development*, 16(2): 227-240.

This article incorporates the findings of two studies of student learning at the University of the South Pacific into a discussion of the use of phenomenographic studies in different countries. While similar conceptions of learning have been found in different cultures, different learning styles may be emphasised in different settings. In discussing the analysis of the interview transcripts, we examine the importance of deriving the intended meaning of words used by students in describing their approaches to study and conceptions of learning from their linguistic contexts. We also differentiate between students' conceptions of learning and the highly strategic approach they may adopt under stressful learning condition. Finally, we discuss the interplay between culturally preferred learning styles and strategies and the institutional culture of the school system from which students have come.

Mugler, F. and Landbeck, R. (1995) The meanings of learning for students at the University of the South Pacific: a pilot study. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

How generalizable across cultures are the descriptions of student learning which have been well established in Western cultures? A project at the University of the South Pacific (USP) in Fiji could provide some answers to this question as USP has students from 12 Pacific nations and there are cultural differences also within each national group. However, we will argue that it is not possible to group students into broad cultural groups and make generalizations about learning conceptions in these groups. As a result we have tried to describe the learning of a group of students at USP rather than to make cultural comparisons. The major part of the paper will describe the results of a pilot project which studied student learning in a third year linguistics class. Two major themes emerged from the analysis of the phenomenographic interviews, namely, the transition and change experienced by students as they adapt to university life and their descriptions of learning and understanding. The students use two meanings for the word 'learning'. The first meaning is the process of acquiring knowledge or broadening existing knowledge and the second is a much deeper meaning resulting from a process of coming to an understanding of the knowledge. (Author's abstract).

Nagle, A. and Marton, F. (1993) Learning, knowing and understanding. Paper presented at the 5th EARLI conference Aix-en-Provence, 31 August-5 September, University of Provence.

Reports a study into qualitatively different forms of perceiving the interrelation between the concepts of understand, learn and know. The interviewees were student teachers in a first year university program. Participants were found to perceive basic concepts, such as learn, understand and know, differently.

Neuman, D. (1991) Early conceptions of division. A phenomenographic approach, *Proceedings of Psychology of Mathematics Education*, 15, 1991, Assisi, Italy, pp. 72-79.

The work on division presented here is done with younger pupils in the 7 - 13 age range, most of them 7 - 10 years old, and it primarily concerns calculation strategies and conceptions of division. In order to identify students informally developed division strategies and the conceptions they represented the children were asked to respond to two problems:

1. Four boys have got 28 marbles to share. how many marbles does each boy have?
2. Mum has baked 42 buns. She puts them into plastic bags, six in each bag. How many bags does she need?

The informally developed conceptions are described in the paper.

Newman, L. (1995) The transition to school for children with special needs: a phenomenographic study. Annual Conference of the Australian Association for Research in Education (AARE), 27-30 November 1995., Hobart, Tas.

Nordenbo, S.E. (1990) How do computer novices perceive information technology? A qualitative study based on a new methodology. *Scandinavian Journal of Educational Research*, 34(1): 43-76.

An investigation of adult learners views of computers. Three different styles of analysis were conducted: narrative reading, polar structure, and phenomenographic. Suggests a different approach to testing the validity of qualitative analyses.

Nuutinen, A. (1995) Elements of conceptual restructuring in university studies. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

In complex learning situations, such as higher education, a constructivistic approach in learning has appeared promising, because scientific knowledge formation itself seems to have the nature of conceptual construction. Analysis of curricula in higher education gives an impression of continuous enrichment of existing conceptual structures rather than a restructuring. However, in scientific knowledge formation we also change constructions, not only enrich them. Certain branches of science even consist of parallel competing conceptual schemes. In the present study, university students' conceptions and experiences of learning were analyzed to identify ingredients and elements of conceptual restructuring. Students (30 in behavioural science and 30 in natural sciences) were interviewed at the beginning, middle and end of their studies. The interview focused on the student's conceptual constructions of some phenomena, the need to change those constructions, and the reasons for any changes. Also, the student's knowledge orientation and learning process were addressed in the interview. The interviews were conducted using the theme interview method. The interviews were transcribed verbatim. Analyses were carried out using phenomenographic method in each topic. The approach used in the study could be called description from the conscious learner's point of view. Rich qualitative descriptions of results are presented and the consequences for university instruction are discussed. (Author s abstract).

Olsson, L.E., Dahlgren, G. and Wen, Q. (1995) A comparative study of Swedish and Chinese children's conceptions of reading. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

This paper presents the findings from a comparative study of Swedish and Chinese children's conceptions of reading. 53 Swedish children were interviewed individually at the end of their schooling in kindergarten and 50 Chinese children at the beginning of the first year of their primary education. The second round of interviews was held one year later, i.e. at the beginning of the second year of their primary education. The questions for the two rounds of interviews were the same. The major questions included:

1. How do they perceive their process of reading?
2. Why do they want to learn to read? and
3. How do they see their learning of reading?

The data analysis will focus on similarities as well as differences in the conceptions of reading of the two groups of subjects. It is well known that the Swedish and Chinese people have radically different written language systems: the former employs an alphabetical system while the latter has a pictographic- ideographic system. Furthermore, they have different cultural values of reading and different ways of teaching reading. A comparison of the changes in their conceptions of reading after one year's primary education will therefore be worth examining. The method used in data-collection and data-analysis is in line with the basic principles of phenomenography. (Author s abstract).

Ophel, J., Prosser, M., & Robinson, I. (1997) First year university students' experiences of studying computer science. HERDSA, Adelaide.

The aim of the project is to describe students' experiences of studying a computer programming language in their first year computer science course. and to examine how these experiences can change as a result of changes to the content and teaching methods in that subject. With changes from the programming language being taught (from Pascal to C++) and changes to the reaching methods (more student-centred) it was expected that students' understanding of what computer programming was about and of the way they approached their studies would change and develop. The research and evaluation has focused on describing students' experiences of studying from a phenomenographic perspective. It has attempted to look at those changes from the students' rather than the researchers' perspective. Students from the last year of teaching Pascal from a more teacher-centred perspective and in the first year of teaching C++ from a more student-centred perspective were surveyed using open-ended written questionnaires. The first stage of the analysis was to identify sets of categories of description for each item and to classify the item responses in terms of these categories. The items were especially chosen so as to be programming language independent and focus on the students' understanding of specific programming concepts, as well as on their study techniques. The research and evaluation has resulted in sets of categories of description of the ways students conceive of, and approach their studies of computer programming, and an analysis how this has changed between the two years. The significance is that when making and evaluating substantial changes to the curriculum, the focus should not only be on the way students evaluate those changes, but more importantly on how they experience and understand the nature of those changes. This study has addressed this issue.

Ottosson, T. and Aberg-Bengtsson, L. (1995) Children's understanding of graphically represented quantitative information. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

Many children have problems understanding graphic representations. This fact, however, is seen by many teachers more as a problem of teaching methods than as a problem concerning children's understanding on a more fundamental level. Despite common use of graphic representations of quantitative information in various contexts, the knowledge about how such representations are conceived, that is, what meaning they have for the beholder, is rather limited. This, together with the pedagogical implications of the results, constitutes the research problem upon which the present project is focusing. Data has been collected by semi-structured interviews of 60 students (8-17 years), focusing upon the interpretation of a set of maps and charts describing socio-economic aspects of an imaginary world. The data analysis thus far has been directed at identifying both different ways of understanding basic principles of graphic representation, and different understandings of the represented content (i.e. 'facts' about the imaginary world). In the presentation of the results, the different conceptions identified will be described, and their relationships to each other discussed. (Author s abstract).

Parer, M. and Benson, R. (1991) Behaviourism, Metacognition and Phenomenography: is there a meeting point? In B. Ross (ed.) *Research and Development in Higher Education*, 13. Papers presented at the 16th annual HERDSA conference at Griffith University 6th-9th July 1990, HERDSA, Sydney.

Paper concludes: it has been our experience ... that the range and combination of techniques from different traditions in a single project has provided a range of insights of different kinds, which answer different questions, but which also complement each other. The study reported examined factors affecting students learning by distance education.

Perry, W.G. (1988) Different worlds in the same classroom. In P. Ramsden (ed.) *Improving Learning: New Perspectives*, London: Kogan Page.

Perry presents differing views of knowledge which students may hold. These are dramatised to provide the reader with clear illustrations of student experience/thinking or behaviour at various stages of development. Includes a discussion of implications for teaching of students differing views.

Pitkethly, A., & Prosser, M. (1995) Examiners' comments on the international context of PhD theses. In C. McNaught and K. Beattie (eds.) *Research into Higher Education: Dilemmas, Directions and Diversions*. Bundoora Vic, Higher Education Research and Development Society of Australasia (HERDSA), Victorian Branch: 129-136.

A qualitative study of examiners' comments for theses awarded the degree of PhD by one Victorian university early in the 1990s identified categories of description by which Australian and overseas examiners internationally reference theses. Further analysis measured the degree of international referencing by Australian and overseas examiners for each of the categories, and concluded that there are strong similarities and only minor differences in the ways in which Australian and overseas examiners place theses in an international context.

Polkinghorne, D.E. (1989) Changing conversations about human science. In S. Kvale (ed.) *Issues of Validity in Qualitative Research*, Studentlitteratur, Lund.

This essay is a review of a variety of answers that have been given to the question What is Human Science? . Includes discussions on The epistemological conversation, Objectivity, Human Science Research, The Epistemic conversation, etc.

Pramling, I. (1995) Phenomenography and practice. *New Zealand Journal of Educational Studies*, 30(2): 135-148.

Explores the use of phenomenography in educational practice. Phenomenography holds that learning implies perceiving, conceptualizing, experiencing, or understanding something differently. It presupposes that knowledge about children's content-specific thinking, methodological knowledge and skills, and the opinion that children learn from each other are essential for a developmental approach. Phenomenography-based educational principles for activities with children include, the ways to get children to think and reflect, use their ideas as a base for the content of the activities, and to create situations from which they can gain opportunities for developing the kind of understanding one wants them to develop. Such principles are illustrated in terms of developing children's understanding of symbols as means of communication. Studies with preschool age children have favored a development which provides the phenomenography-based foundation of knowledge.

Pramling, I. (1991a) Learning about shop: an approach to learning in preschool. *Early Childhood Research Quarterly*, 6: 151-166.

70 children and their teachers participated in an investigation into effective ways of developing students understanding of relevant aspects of the shop theme. This is one of a series of papers written by Pramling focussing on learning of preschool children.

Pramling, I. (1991b) To develop the child's understanding of the surrounding world. Paper presented at the Fifth Early Childhood Convention, Dunedin, New Zealand, 8-13 September, 1991.

This paper outlines a research project aimed at developing an experiential approach to learning at pre-school which fosters the development of sophisticated conceptions of phenomena such as numbers, aspects of the natural and man-made world. The project involves six preschool teachers, working with groups of 5 and 6 year olds. The teachers work to develop competence in applying an experientially oriented approach which will influence the ways in which students are thinking about the phenomena under study. At the time of writing the first phase of the research had been completed.

Pramling, I. (1988) Developing children's thinking about their own learning. *British Journal of Educational Psychology*, 58(3): 266-278.

Pramling has been working for some years on preschool children's understanding of learning. This paper describes a study which sought to discover whether different teaching-learning environments could bring about different conceptions of learning. The study focuses on developing children's awareness of their own learning.

Pramling, I. (1986) The origin of the child's idea of learning through practice. *European Journal of Psychology of Education*, 1(3): 31-46.

This paper reports a phenomenographic study into Swedish pre-school children's conceptions of learning. It is reported in a traditional form - research approach, method- including interviews and analysis, outcomes, discussion and implications. The analysis section deals with questions of how individual interviews are treated and intra-individual variation.

Pratt, D.D. (1992) Conceptions of teaching. *Adult Education Quarterly*, 42(4): 203-220.

From interviews of 253 adults and teachers of adults in Canada, the People's Republic of China, Hong Kong, Singapore, and the United States, five conceptions of teaching emerged: Engineering - Delivering Content; Apprenticeship - Modelling Ways of Being; Developmental - Cultivating the Intellect; Nurturing - Facilitating personal Agency; and Social Reform - Seeking a Better society. Variation amongst conceptions was examined in relation to three interdependent aspects of each conception: Actions, intentions and beliefs related to one or more of five elements and the relationship amongst those elements: teacher, learner, content, context, and/or and ideal vision for society. Findings have implications for cross-cultural work, the evaluation of teaching, and the development of teachers. (Author's abstract).

Prichard, S., & Epting, F. (1992) Children and death: new horizons in theory and measurement. *Omega: Journal of Death and Dying*, 24(4): 271-288.

Reviews recent research on children and death. Focuses on children's death concept development and children and bereavement. Reviews psychometric instrumentation used in current projects within these areas. Discusses and reviews variety of structured interview formats, paper-and-pencil formats, and

phenomenographic methodology. Cites area of children and death anxiety as new frontier for theoretical and psychometric investigation.

Prosser, M. (1994a) A phenomenographic study of students' intuitive and conceptual understanding of certain electrical phenomena. *Instructional Science*, 22(3): 189-205.

Prosser, M. (1994b) Using phenomenographic research methods in large scale studies of student learning in higher education. In R. Ballantyne and C. Bruce (eds.) *Phenomenography: Philosophy and Practice*. Proceedings. QUT, Brisbane, Australia, pp. 321- 332.

In the studies outlined in this paper, the use of phenomenographic research methods for large scale studies are described....data sources include students responses to short written tasks and examination questions. The projects reported have been collaborative projects between educational researchers and academics. The focus of the paper is on how practising teachers might obtain information from their students which will help them better understand their students experiences of studying in the courses they are teaching. (Adapted from author s abstract).

Prosser, M. (1994c) Some experiences of using phenomenographic research methodology in the context of research in teaching and learning. In J. Bowden and E. Walsh (eds.) *Phenomenographic Research: Variations in Method*, EQARD, RMIT.

In this chapter Prosser describes and analyses his experience of using the phenomenographic approach in both replicating previous research and conducting new research. He examines issues in relation to data collection and analysis. Many of the descriptions are given in relation to the procedures followed in working with a novice researcher, in this case a research assistant. This treatment identifies many of the problems which may be faced by research students learning the approach.

Prosser, M. (1993) Phenomenography and the principles and practices of learning. *Higher Education Research and Development*, 12(1): 21-31.

Phenomenographic studies of student learning have shown that students learn in qualitatively different ways and have related qualitatively different learning outcomes. But phenomenography is not, and has never claimed to be, a theory of student learning. This is not to say, however, that there is not a view of student learning which is consistent with these studies. This paper outlines such a view and analyses a number of teaching and learning problems from this perspective. The paper argues that the students experiences of teaching and learning situations are fundamental to what they learn. (Author s abstract).

Prosser, M. and Millar, R. (1989) The 'how' and the 'what' of learning physics. *European Journal of Psychology of Education*, 4(4): 513-528.

The study reported here is a replication of Johansson, Marton and Svensson s 1985 investigation. Prosser uses the relational approach to learning as a starting point.

Prosser, M., & Trigwell, K. (1997) Relations between perceptions of the teaching environment and approaches to teaching. *British Journal of Educational Psychology*, 67(1): 25-35.

This study aimed to develop an inventory of university teachers' perceptions of their teaching environment (PTE) and how those perceptions related to their approaches to teaching. This exploratory study found systematic relations between the perceptions and approaches. The relations observed suggest that the adoption of a conceptual change and student focused approach to teaching is associated with perceptions that the teacher has control over what is taught and how it is taught, as well as perceptions that the department values teaching and that class size is not too large. The paper concludes by arguing that if we are to improve the quality of teaching and learning in higher education we will need to take account of the perceptions teachers have of their teaching context.

Prosser, M., & Trigwell, K. (1995) Relating teaching Approach to experience of the teaching environment. Higher education: blending tradition and technology: proceedings of the 1995 Annual Conference of the Higher Education Research and Development Society of Australasia (HERDSA), Rockhampton Qld.

Teachers and students in 49 science subjects in Australian universities have been surveyed in a study of the relations between teaching environments, approaches to teaching and student approaches to learning. This paper reports on the relations between perceptions of the teaching environment and approaches to teaching.

Prosser, M., Trigwell, K., Hazel, E., & Gallagher, P. (1994) Students' experiences of teaching and learning at the topic level. In G. Ryan, P. Little and I. Dunn (eds.) *Selected contributions presented at the nineteenth annual national conference and twenty first birthday celebration of the Higher Education Research and Development Society of Australasia*, held at the University of New South Wales Sydney, Australia, 2-6 July, 1993. Campbelltown NSW, Higher Education Research and Development Society of Australasia (HERDSA): 305-310.

The authors explored the relations between students' perceptions of context, approach to studying and outcomes of learning in contrasting learning contexts. the topics were chosen from first year university Physics and Biology courses.

Prosser, M., Trigwell, K., Marton, F., & Runesson, U. (1997) Relations between epistemological beliefs and educational practice (as revealed in problem solving). HERDSA, Adelaide.

Teachers of first year science courses at two Australian universities were interviewed about their approaches to teaching and their conceptions of teaching and learning. From the interviews, five qualitatively different descriptions of problem solving practices have been constituted. In the same interviews, three quite different epistemologies were also identified. They have been labelled cognitivist, constitutionalist and constructivist. This paper reports on the different ways in which the staff who articulate these beliefs described their approaches to problem solving. The cognitivist describes problem solving as applying what you know to the problem in terms of preexisting bits of information and skills. The constructivist describes problem solving as relating the problem to the students' knowledge structure in terms of a pre-existing conceptual structure, while the constitutionalist describes it at relating the problem to the phenomenon in terms of the phenomenon represented in the problem. The main difference in this third case is that the problem is not mapped onto either external or internal knowledge, but is seen in terms of the phenomenon to which it relates.

Prosser, M., Walker, P. and Millar, R. (1996) Differences in students' perceptions of learning physics. *Physics Education*, 31(1): 43-48.

Used an open-ended response survey to elicit first-year physics student's ideas on the nature of physics and how to study it. Describes the categories that were identified by a phenomenographic methodology and discusses the distribution of responses across the categories. Discusses issues that emerged and implications for the practice of teaching physics.

Prosser, M., Trigwell, K., & Taylor, P. (1994) A phenomenographic study of academics' conceptions of science learning and teaching. *Learning and Instruction*, 4(3): 217-231.

Outlines the qualitative research method and results of an investigation of the conceptions of teaching and learning held by 24 teachers of 1st-year university chemistry and physics courses. In both cases a limited number of qualitatively different categories of description were identified (6 and 5 respectively) ranging from information transmission to facilitating conceptual change in teaching, and knowledge accumulation to conceptual change in learning. An analysis of the referential and structural components of the conceptions is used to develop the internal structure of the conceptions. Finally, the relation of the results to conceptual change programs is discussed.

Prosser, M., & Webb, C. (1994) Relating the process of undergraduate essay writing to the finished product. *Studies in Higher Education*, 19(2): 125-138.

Research on college student essay writing looked at the qualitatively different ways that students conceive of essays, and therefore approach the writing process, and the qualitatively different types of essays that result. The findings are compared, and implications for the teaching of undergraduate essay writing are examined.

Prosser, M. and Webb, C. (1992) Qualitative differences in the process and product of undergraduate essay writing? In M. Parer (ed.) *Research and Development*, 15, Higher Education Research and Development Society of Australasia, pp. 534 - 541.

Reports a study into conceptions of essay writing amongst Sociology students at the University of Sydney.

Ramsden, P. (1992) *Learning to Teach in Higher Education*. London: Routledge.

This book addresses the problem of how best to evaluate and improve the standard of higher education and teaching in a climate of accountability and appraisal. It links educational theory and the practical realities of teaching in an entirely new way. Designed for the use of practising lecturers, it argues that becoming a good teacher in higher education involves listening to one's students and changing one's understanding of teaching." (Extract from monograph abstract) Ramsden draws in part from phenomenographic research undertaken in higher education during the last 20 years. Underpinning the book is the idea, central to phenomenographic research, that learning involves a qualitative change in a person's view of reality (p4).

Ramsden, P. (1988a) Studying learning: improving teaching. In P. Ramsden (ed.) *Improving Learning: New Perspectives*. London: Kogan Page.

In this first chapter of *Improving Learning: new perspectives*, Ramsden argues for an approach to teaching and learning which involves the teacher in identifying different conceptions which students hold of a phenomenon, and working to change students' conceptions. The important difference between the work of phenomenographers and that of cognitive psychologists is also highlighted: an approach to learning or a conception of a particular phenomenon is not something that is inside a student but something between the student and the task or concept (p20). The chapter concludes with an outline of the features of a relational view of teaching and learning.

Ramsden, P. (ed.) (1988b) *Improving Learning: new perspectives*. London: Kogan Page.

This is an important monograph bringing together a range of educational research influenced by phenomenography. The book includes chapters describing phenomenographic methodology and phenomenographic research. It also emphasises how teachers have applied insights derived from phenomenographic research. Argues for a relational view of teaching and learning.

Ramsden, P., Whelan, G. and Cooper, D. (1989) Some phenomena of medical students' diagnostic problem-solving. *Medical Education*, 23:108-117.

Reports a phenomenographic investigation into the qualitatively different ways in which fourth year medical students handle information in diagnostic problems. Two different approaches to the handling of information are identified: ordering and structuring, the latter of which is deemed to be preferable. Implications for teaching and assessment are outlined.

Ramsden, P., Masters, G., Bowden, J., Dall'Alba, G., Laurillard, D., Martin, E., et al. (1989) Speed, distance and time: a phenomenographic study of students' conceptions in kinematics. Parkville Vic, University of Melbourne, Centre for the Study of Higher Education.

The present paper examines differences in students' conceptions of phenomena associated with basic concepts of simple projectile motion. The results presented focus on one aspect of projectile motion - students' understandings of kinematics concepts associated with the fundamental idea of speed as a function of distance and time (in vector terminology, velocity as a function of displacement and time). The special concern of this paper is to introduce the theoretical perspective on which the project is based and to discuss some common aspects of the problems.

Ramsden, P., Masters, G., Stephanou, A., Walsh, E., Martin, E., Laurillard, D., et al. (1993) Phenomenographic research and the measurement of understanding: an investigation of students' conceptions of speed distance, and time. *International Journal of Educational Research*, 19(3): 301-316.

Renstrom, L., Andersson, B. and Marton, F. (1990) Students' conceptions of matter. *Journal of Educational Psychology*, 82(3): 555-569.

Reports a study into school students' conceptions of matter conducted in the classical phenomenographic style. Reliability checks were conducted by two judges, a departure from the usual single judge. Includes descriptions of the different conceptions and an outcome space.

Roth, K. and Anderson, C. (1988) Promoting conceptual change learning from science textbooks. In P. Ramsden (ed.) *Improving Learning: New Perspectives*. London: Kogan Page.

This is not a phenomenographic study as such. It is of interest to teachers who are working to change students' conceptions. The focus is on different reading strategies which students bring to textbooks, and how teachers can use textbooks to promote conceptual change learning.

Saarela, T., & Kiviharju, U. (1995) Evaluating the usefulness of training in psychogeriatrics. *International Journal of Geriatric Psychiatry*, 10(12): 1019-1022.

Evaluated the perceived usefulness of 2 training courses in psychogeriatrics among 51 primary health care doctors, nurses, and social workers. Ss were placed in 1 of 2 groups: (1) a "case group," in which Ss worked on their own patients' cases with the help of psychogeriatric specialists, or (2) a "lecture group," in which Ss attended lectures covering key areas of psychogeriatrics. Ss were interviewed 2-4 mo after the courses, and the material was analyzed by the phenomenographic method. The main result of the training for both groups, from the trainee's point of view, was an enhanced experience of psychogeriatric work and a more creative application of preexisting professional knowledge. No differences in outcome were detected between the groups.

Säljö, R. (in press) Human growth and the complex society: notes on the mono-cultural bias of theories of learning. *Cultural Dynamics*.

The purpose of this paper is to contribute to the analysis of the conceptions of learning (and cognition) that dominate research in several disciplines. Does not focus on the work of Marton and other phenomenographers. Argues that conceptions of learning, knowledge and human growth are fundamentally cultural in nature, but the dominant rendering of these phenomena in scientific discourse serves to hide such differences. Represents part of Säljö's present interest in a socio-cultural approach to learning.

Säljö, R. (1997) Talk as data and practice - a critical look at phenomenographic inquiry and the appeal to experience. *Higher Education Research & Development*, 16(2): 173-190.

The article continues a critical discussion of phenomenography by raising some issues on the status of interview data in such research. It is argued that it is doubtful if and in what sense the interview data generated in much of the empirical work within this tradition can be assumed to refer to "ways of experiencing", the core object of research in phenomenography. In general, it would seem that the data must be understood as indicative of accounting practices - ways of talking and reasoning - that interviewees, for one reason or another, find appropriate when asked questions. Very little, if anything, is gained in analytical terms by an initial commitment to a position in which the researcher connects utterances to experiences rather than to discourse, since the latter is what is in fact analysed. It is also argued that in some important respects discursive practices must be seen as preceding experience, and that experiential accounts given by individuals are grounded in discursive patterns.

Säljö, R. (1994) Minding action-conceiving of the world versus participating in cultural practices. *Nordisk Pedagogik*, 14(4): 71-80.

This article discusses some features of phenomenography. It is argued that the mode in which conceptions of the world are studied needs to be further clarified. Säljö critiques a range of aspects of the phenomenographic approach.

Säljö, R. (1991a) Introduction: culture and learning. *Learning and Instruction* 1: 179-185.

This paper summarises a series of articles appearing in an early volume of *Learning and Instruction*, a journal established under the auspices of the European Association of Research into Learning and Instruction. Säljö's comments point out the direction being taken by contributors to this volume: My reading of the articles reductionist nature of cognitivism and discuss issues of human change and learning against a background that I understand as having to do with culture and ways of world making rooted in a recognition of the significance of culturally mediated ways of understanding and explaining the world. (Reflects the sociocultural approach).

Säljö, R. (1991b) Learning and mediation: fitting reality into a table, *Learning and Instruction* 1: 261-272.

The background of this article is an interest in a sociocultural perspective on cognition, in particular problems that concern the appropriation and use of cultural tools (in a Vygotskian sense). Drawing from the data of an extensive study of the use and understanding of a particular type of tool, a postage table, it is argued that the difficulties of coordinating the table with an outside reality that people have, cannot be understood in terms of failures to correctly apply particular forms of reasoning.... Rather, the use of a tool presupposes sensitivity to contextual considerations applicable for specific situations or domains. (Author's abstract).

Säljö, R. (1991c) Piagetian controversies, cognitive competence, and assumptions about human communication, *Educational Psychology Review* 3(2): 117-126.

This article is a comment on Ed Elbers analysis of the debate between R. Gelman and R. Siegler on the development of fundamental counting competencies. An attempt is made to characterise some of the theoretical positions of Gelman and Siegler. It is argued that the tendency to reduce human cognitive performance to an issue of either the application of performed competencies of various kinds, or, alternatively, of the use of domain specific knowledge, hampers our understanding of cognitive growth and the mastery of intellectual tools. The alternative offered is that all human activity - including what takes place in the experiment - should be seen as socially and culturally situated, and that our focus should be on understanding the resources - mental as well as practical - that people draw on when solving problems. (Author's abstract).

Säljö, R. (1988) Learning in educational settings: methods of enquiry. In Paul Ramsden (ed.) *Improving Learning: new perspectives*. London: Kogan Page.

This is one of the few papers that deals entirely with phenomenographic method in all its stages. Headings include: What comes first - theory or method, qualitative and quantitative methods, studying the world as perceived, the phenomenographic approach, generating and analysing data, the status of conceptions and the use of research, the research process and the reliability of findings. A useful starting point in coming to grips with the method. See also Marton's papers in *Instructional Science* and the *Journal of Thought*.

Säljö, R. (1979) Learning about learning. *Higher Education*, 8: 443-451.

Early writing on conceptions of learning. 90 people of varying ages were interviewed. Reports the famous question What do you mean by learning?

Säljö, R. and Cedersund, E. (1988) The retention of news: on empirical results and implicit assumptions of human communication. In M.M. Gruneberg, P.E. Morris and R.N. Sykes (eds.) *Practical Aspects of Memory: current research and issues*, Vol. 1. Brisbane: John Wiley and Sons, Brisbane.

Although still retaining an interest in phenomenography, Roger Säljö's primary interests are in the area of communication. In this paper he argues that when studying retention in everyday life in a world characterised by information overflow, it is essential to uphold a clear distinction between problems of retention and comprehension that arise when there is a genuine commitment on the part of the individual to making sense of what is said and the problems that arise in situations where there is no such commitment...

Säljö, R. and Wyndhamn, J. (1987) The formal setting as context for cognitive activities. An empirical study of arithmetic operations under conflicting premisses for communication. *European Journal of Psychology of Education*, 2(3): 233-245.

A crucial aspect of what are conventionally conceived as differences in mathematical ability seems, judging from the present results, to have more to do with the capacity to decipher ambiguous communicative situations than with the mastery of a mathematical algorithm per se.

Salner, M. (1989) Validity in human science research. In S. Kvale (ed.) *Issues of Validity in Qualitative Research*. Studentlitteratur, Lund.

Salner describes the domain of human science as a matrix of inter-subjective meanings (p49) within which the human science researcher operates. She continues to focus on the kinds of epistemological and methodological assumptions appropriate to inquiry into this domain (p49). Salner argues that discussion of the validity of human science research must proceed from within the epistemological assumptions that human science researchers make about their domain and inquiry into it (p49). The status of phenomenography as a Human Science research approach has been subject to considerable debate.

Samuelowicz, K. and Bain, J.D. (1992) Conceptions of teaching held by academic teachers. *Higher Education*, 24(1): 93-112.

This study examines conceptions of teaching held by academic teachers in the fields of science and social science, in two universities: a distance university in the UK and a traditional one in Australia. A five level classification of conceptions of teaching is proposed. A process of arriving at this scheme is discussed and a formalised coding system is presented which helps to delimit, with greater confidence, the boundaries of each conception, and helps to order conceptions, to compare conceptions proposed by other researchers, and to place individuals within conceptions. The same coding system is then used to define the concepts of student-centred and teacher-centred approaches to teaching. There is a strong suggestion that teaching conceptions are context dependant. (Author abstract).

Sandberg, J. (1997) Are phenomenographic results reliable? *Higher Education Research & Development*, 16(2): 203-212.

This article takes up the issue of the extent to which phenomenographic results are reliable. It is argued that interjudge reliability, traditionally used within phenomenography does not take into account the researcher's procedures for achieving fidelity to the individuals' conceptions investigated. Second, and most fundamental, the use of interjudge reliability based on an objectivistic epistemology gives rise to methodological and theoretical inconsistency within phenomenography. Reliability as interpretative awareness, maintained through phenomenological reduction, is suggested as one way of overcoming the problem of establishing reliability of phenomenographic results.

Sandberg, J. (1995a) Are phenomenographic results reliable? *Nordisk Pedagogik*, no 3.

This article takes up the issue of the extent to which phenomenographic results are reliable. It is argued that interjudge reliability, traditionally used within phenomenography, is an unreliable way of establishing reliability of the results produced. First, interjudge reliability does not take into account the researcher's procedures for achieving fidelity to the individuals' conceptions investigated. Second, and most fundamental, the use of interjudge reliability based on an objectivistic epistemology gives rise to methodological and theoretical inconsistency within phenomenography. Reliability as interpretative awareness, maintained through the phenomenological reduction, is suggested as one way of overcoming the problem of establishing reliability of phenomenographic results.

Sandberg, J. (1995b) *How do we justify knowledge produced by interpretative approaches?* Stockholm, Stockholm School of Economics.

This paper explores criteria for justifying knowledge produced by interpretative approaches within business administration. It is argued that such criteria should accord with both the assumptions and theories of truth underlying the interpretative research tradition. As a first step, ontological and epistemological assumptions underlying the interpretative research tradition are explicated. Second, possible theories of truth which stipulate what truth is and when it is achieved within the interpretative research tradition are explored. Finally, based on the investigation of ontological and epistemological assumptions and theories of truth, criteria for justifying knowledge produced by interpretative approaches are proposed.

Sandberg, J. (1994a) *Human Competence at Work*, PhD thesis, University of Gothenburg, Sweden.

Sandberg, J. (1994b) *Human Competence at Work: an Interpretative Approach*. Sweden.

The central research question explored in this study is how human competence at work can be made apprehensible for managers as a starting point for training and development in the primary aim of the study is to overcome the limitations identified within the rationalistic approaches by elaborating an alternative approach to competence which is not based on a dualist ontology and objectivistic epistemology. An interpretative approach, phenomenography, is put forward as an alternative to the rationalistic approaches. (Extract from authors abstract).

Sandberg, J. (1991a) *Competence as intentional achievement: a phenomenographic study*. Occasional Paper 91.4, ERADU, RMIT.

In this study I explored the competence of engine optimisers within the Volvo Car Company. In this process I have tried to understand the individual's conception of their work, that is, how the work appeared to them, the optimisers, in the accomplishment of their task..'; Investigating the individual's conception of his or her work is used as an avenue for uncovering the intentional dimension of human competence. This report also describes the research outcomes and implications for a new approach to understanding competence.

Sandberg, J. (1991b) *Competence as intentionality: a phenomenographic approach*. Paper presented at the tenth conference of the International Human Science Research Association, University of Goteborg, Sweden.

One of a series of papers reporting Sandberg's research into the competence of engine optimisers.

Scouller, K. M., & Prosser, M. (1994) Students' experiences in studying for multiple choice question examinations. *Studies in Higher Education*, 19(3): 267-279.

A survey of 190 first- and second-year university students investigated the relationship between student orientation to learning (deep, surface, or achieving), perceptions of the skills and abilities being assessed by multiple-choice tests, and study strategies they intended to use for upcoming examinations.

Simons, S. (1982) *Conversation piece: the practice of interviewing in case study research*. In L. Bartlett, S. Kemmis and G Gillard (eds.) *Case Study Methods - the Conduct of Fieldwork*, vol 6, Readings 34-44. Deakin Uni Press: Deakin.

An excellent introduction to the hows and what to do's and what not to do's for the beginning interviewer. Of particular interest to those interviewing in schools but has an appeal to a wider audience.

Skrzeczynski, C. (1995) *Linking literacy: the role of the teacher-librarian in literacy education*. Wagga Wagga, N.S.W., Centre for Information Studies.

Focuses on the varying understandings of the involvement of teacher-librarians in literacy education. The relevance lies in the English Language Arts Syllabus (1991) now being implemented in Queensland schools. This syllabus incorporates current theories of cross-curriculum literacy skill development. Teacher-librarians are experienced in the integrated approach to skill development and are therefore well placed to be in the vanguard of literacy programs. Conceptions of the involvement of teacher-librarians in the literacy education of students in Years 1 to 7 were sought using focus group methodology. Eleven discussions were

held with groups of primary class teachers and groups of primary teacher-librarians. Consulting class teachers as well as teacher-librarians was considered important since relevant literature demonstrated that the success of the teacher-librarian's involvement is dependent on collaboration with the class teacher. The data collected were subjected to phenomenographic analysis. Seven conceptions of the involvement of the teacher-librarian were discovered: the teacher-librarian is not involved in literacy education; teacher-librarian as assistant; as manager; as independent teacher; as equal teaching partner; as expert/consultant; as leader. The seven categories are related by means of the varying professional foci of the teacher-librarian. Knowledge and expertise of the teacher and the librarian are recognized differently in each category. The teacher-librarian's professional focus is expressed by the respondents in many ways, indicating that involvement in literacy education can be widespread and varied. Resources, curriculum, professional development, environment, assessment and evaluation were identified. The diversity of involvement and the diversity of the levels at which it is conceived have implications for student learning, staffing of school libraries, training of teachers and teacher-librarians, the position of teacher-librarians within the school and for areas beyond literacy education.

Skrzeczynski, C. (1993) *Linking literacy: the role of the teacher-librarian in literacy education*. Wagga Wagga NSW, Charles Sturt University - Riverina.

Teacher librarians become involved in literacy education in a variety of ways. The different understandings people have of this involvement is the focus of this study. Becoming aware of these different conceptions provides teacher librarians with an awareness of some ways in which they can address the literacy needs of primary school students. The relevance of this investigation lies in the new English Language Arts Syllabus (1991) presently undergoing implementation in Queensland schools. This syllabus incorporates current theories of cross curriculum literacy skill development. Teacher librarians are experienced in this integrated approach to skill development and are therefore well placed to be in the vanguard of the implementation of these literacy programs. Conceptions of the involvement of teacher librarians in the literacy education of students in Years 1 to 7 were sought using focus group methodology. A total of eleven focus group discussions were held with groups of primary class teachers and groups of primary teacher librarians participating. Consulting class teachers as well as teacher librarians was considered important since relevant literature demonstrated that the success of the teacher librarian's involvement is dependent on collaboration with the class teacher. The data collected was subjected to phenomenographic analysis. From the responses, seven different conceptions of the involvement of the teacher librarian in the literacy education of primary students were discovered: the teacher librarian is not involved in literacy education; teacher librarian as assistant; as manager; as independent teacher; as equal teaching partner; as expert/consultant; as leader. The seven categories are related by means of the varying professional focus of the teacher librarian that they reflect. Knowledge and expertise of the professional teacher and the professional librarian are recognised differently in each category. The teacher librarian's professional focus is expressed by the respondents in many different ways indicating that the involvement of the teacher librarian in literacy education can be widespread and varied. The areas of resources, curriculum, professional development, environment, assessment and evaluation were highlighted as areas in which this involvement can occur. The diversity of involvement and the diversity of the levels at which it is conceived by the respondents has implications for student learning, staffing of school libraries, training of teachers and teacher librarians, the position of teacher librarians within the school and for areas beyond literacy education.

Spinelli, E. (1989) *The Interpreted World: an Introduction to Phenomenological Psychology*. London: Sage.

Spinelli's is a very accessible introduction to the history and nature of phenomenology. He explores the origins of phenomenology, transcendental and existential phenomenology, the nature of reality and a number of phenomenology's fundamental issues. Highly recommended.

Stalker, J. (1993) Voluntary participation: deconstructing the myth. *Adult Education Quarterly*, 43(2): 63-75.

The technique of phenomenography was applied to data from interviews with 20 workers having high school diplomas or less. Participation in organized adult education activities was found to be often other-determined, demonstrating that the concept of voluntary participation does not adequately address issues of power, authority, and control.

Stein, S. J. (1996) *Students' conceptions of science across the years of schooling*. Faculty of Education. Brisbane, Queensland University of Technology.

The alternative frameworks movement has in the last ten to fifteen years emphasised that having knowledge of the variety of ways students conceptualise science assists teachers to tap into students' current understanding of science concepts. This enables teachers to apply their science knowledge together with their teaching and learning knowledge most appropriately. Using a phenomenographic research approach, this study examined students' conceptions of the nature of science. Categories of description about how students conceptualise science were derived from the writings of students' experience of science in Years 4, 7, 9, 11 and 12. Four outcome spaces that indicated links across a range of the categories of description were outlined. The results suggest the need for educators to be concerned about the experience of science being portrayed to students, including the more experienced years 11 and 12 students, and to ensure that a modern philosophical view of the nature of science is made explicit in curricula they implement.

Svensson, L. (1997) Theoretical foundations of phenomenography. *Higher Education Research & Development*, 16(2): 159-172.

In this article the concepts of research tradition, research programme, research tool and research orientation are used to clarify the character of phenomenography. Phenomenography is said to be fundamentally a research orientation and to be characterised by the delimitation of an aim in relation to a kind of object. The aim is to describe and the kind of object is a conception. Phenomenographic research also has common characteristics of method of a general kind related to the orientation and these are called research approach. The orientation and approach together are said to represent a research specialisation. The historical roots and the ontological, epistemological and methodological assumptions of this research specialisation are described and summarised. Lastly, phenomenography is described as a reaction against and an alternative to dominant positivistic, behaviouristic, and quantitative research and as making its own ontological, epistemological and methodological assumptions with inspiration from, and similarities to, several older and concomitant traditions, without agreeing entirely with any of these.

Svensson, L. (1994) Theoretical foundations of Phenomenography. In R. Ballantyne and C. Bruce (eds.) *Phenomenography: Philosophy and Practice*. Proceedings. QUT, Brisbane, Australia, pp. 9-20.

In this paper the foundation of phenomenography is discussed. The author provides an interpretation of the historical development of phenomenography as well as arguments about its theoretical foundations. What is emphasised is an understanding of the historical roots and the scientific context of phenomenography as a developing new tradition of research. The idea is to give a description of the historical roots and at the same time, point out the theoretical foundation most in line with the origin of the tradition. (Adapted from author's introduction).

Svensson, L. (1991) Development of knowledge about knowledge development. Paper presented at the 10th conference of the international Human Science Research Association Gothenburg, Sweden.

This paper consists of an extended analysis of the nature of conception and approach as they relate to phenomenography and the study of student learning.

Svensson, L. (1989a) The conceptualization of cases of physical motion. *European Journal of Psychology of Education*, 4(4): 529-545.

Reports Svensson's investigations into conceptions of mechanics concepts. Includes a useful section differentiating between the notions of concept, conception and conceptualisation.

Svensson, L. (1989b) Autodidactics. Paper Presented at the Third European Conference for Research on Learning and Instruction, Madrid, Spain, September 4-7, 1989.

In an ongoing project at the University of Lund, Sweden, adults are being interviewed about their studies outside organised education. The project is concerned with the autodidactics of these studies, ie. with what is studied, how the studies are carried out and what the basis is for determination of the what and how of the studies. Data collection has not been finished and no thorough analysis has been made of any part of the data. In the following, the field of research, the research problem and some general characteristics of the investigation will be discussed. (p1).

Svensson, L. (1985a) Contextual analysis - the development of a research approach. Paper presented to the 2nd Conference on Qualitative Research in Psychology. Leusden, The Netherlands.

In moving towards a methodological description of the Gothenburg based research which has come to be known as phenomenographic in approach, Svensson addresses some of the tensions arising from not having a clear methodological position. It seems quite clear that our approach is placed between two main groupings of research and we have been asked for clarification and attacked from both sides. He goes on to argue the analytic rigour of contextual analysis is the methodology of our work. What will be suggested here is that contextual analysis is an alternative to traditional and dominating methodologies and a synthesis of some important characteristics of these methodologies (p2).

Svensson, L. (1985b) The role of experience in adult thinking about evidence for causal interpretations. *Human Learning*, 4: 187-201.

A group of nurses and a group of technicians reasoned about evidence for the existence of a causal relation in a medical and a technical case. A statement about the existence of the relation was presented and the subjects were asked what evidence might and should be behind such a statement. In an unstructured in-depth interview, they outlined their conceptions of the problem of evidence in each example by suggesting the kinds of investigations that would be relevant. The nurses and the technicians relied on different knowledge of the specific subject matter and they placed the evidence problem in different contexts giving different meanings to the problem. (Author's abstract). This paper is representative of Svensson's interest in situated reasoning, and appears to be linked to Säljö's recent research into remembering.

Svensson, L. (1984a) Skill in learning. In F. Marton, D. Hounsell and N. Entwistle (eds.) *The Experience of learning*. Edinburgh: Scottish Academic Press.

It is the aim of the present chapter to pursue further the question of organisation in learning and to specify in greater detail the nature of the relation between the activity of the learner and the outcome of learning. ...the term skill will be used to refer to the nature or the quality of the interaction. The purpose of this chapter is to discuss the most important general characteristics of skill in learning.

Svensson, L. (1984b) Three Approaches to Descriptive Research. Paper presented at the Symposium on Qualitative Research in Psychology, Perugia, Italy, August 8-12, 1983. Report No. 1984:01, Dept of Education: University of Goteborg.

A useful paper exploring the similarities and differences between three research approaches, described as emphasising different aspects or having different turns. These emanate from:

University of Goteborg (the scientific turn)
Duchesne University (the philosophical turn)
University of London (the linguistic turn)

Aspects explored include the commitment of the turns, the fields of research with which they are concerned, the design and collection of data, and the kinds of descriptions developed as outcomes.

Svensson, L. (1979) The Context-Dependent Meaning of Learning. Reports from the Institute of Education, University of Goteborg, no.82.

This paper presents an early representation of what has become known as a relational view of learning. What is suggested here is that learning is basically a change in the relation between individual and situation... (p12). This view of learning is taken up by Marton and other educational researchers such as Bowden and Ramsden.

Svensson, L. and Gerrevall, P. (1991) Expressions of understanding and forms of examination. Paper presented at the Fourth European Conference for Research on Learning and Instruction, Turku, Finland, August 24-28, 1991.

...a small exploratory study was made concerning expressions of understanding and forms of examination in a university course in automatic control for first year university engineering students. The aim was to study some different variations in the content and form of the questions in an ordinary examination situation and to analyse what these variations might mean to the demands and possibilities of expressing understanding. (p2).

Svensson, L. and Hogfors, C. (1988) Conceptions as the content of teaching: improving education in mechanics. In P. Ramsden (ed.) *Improving Learning: New Perspectives*. London: Kogan Page.

A discussion of Svensson's work into conceptions of phenomena in a mechanics course with particular reference to how teachers can be encouraged to make conceptions part of the content of teaching. Discusses teacher presentation of alternative conceptions, diagnoses of students' conceptions used as content in teaching, confrontations between students and teacher discussions of course goals (p166).

Svensson, L. and Theman, J. (1983) The relation between categories of description and an interview protocol in a case of phenomenographic research. Paper presented at the Second Annual Human Science Research Conference, Duquesne University, Pittsburgh, P.A.

An important paper discussing the validity of categories of description in relation to the interview protocol. The authors explore the nature of conceptions and categories of description in detail, then use a case study to describe how the arising categories can be validated. A conception is described as representing a relation between an individual and a part of the world (p8).

Tamm, M. E. and Granqvist, A. (1995) The meaning of death for children and adolescents: a phenomenographic study of drawings. *Death Studies*, 19 (3): 203-222.

Investigated the qualitative differences in 213 girls' and 218 boys' (aged 9, 10, 12, 13, 15, 16, 18, and 19 yrs) concepts of death, as reflected in their drawing. Ss were asked to draw their impression of the word "death" and to give a verbal commentary on what they had drawn. The drawings were analyzed according to a phenomenographic method and assigned to 1 of 3 superordinate and 10 subordinate qualitative categories. The categories were both age and gender related. Biological death concepts dominated the younger age groups (aged 9-12 yrs), and metaphysical death concepts were found predominately in the older age groups. Boys had more violent death concepts than did girls and personified death more often. Girls depicted death in more emotional terms than boys did.

Tomlinson, P. (1989) Having it both ways: hierarchical focussing as research interview method. *British Educational Research Journal* 15(2): 155-76.

Torell, G. (1990) Children's Conceptions of Large-Scale Environments. Department of Psychology, University of Goteborg.

This doctoral theses from the University of Goteborg adopts a Piagetian approach to children's conceptions. It reports three developmental studies on how children represent knowledge about a large-scale environment. As a thesis its format is of interest. The document comprises reprints of four prepublished papers - including a journal article, a book chapter, and two issues of the Goteborg Psychological reports.

Trigwell, K. (1994a) Publishing the results of phenomenographic research. In R. Ballantyne and C. Bruce (eds.) *Phenomenography: Philosophy and Practice*. Proceedings. QUT, Brisbane, Australia, pp. 401-410.

This paper includes comments from phenomenographers on some of their publishing experiences, explores some of the publishing difficulties associated with phenomenography and, building on those experiences and difficulties, concludes with some advice on publishing phenomenographic research. (Extract from author's abstract).

Trigwell, K. (1994b) The first stage of a phenomenographic study of phenomenography. In J. Bowden and E. Walsh (eds.) *Phenomenographic Research: Variations in Method*. EQARD, RMIT.

This chapter presents the transcript of an interview on the phenomenographic approach. The form as well as the content of the chapter is of interest, that is it serves as an example of an interview transcript as well as capturing one person's understanding of phenomenography in some detail. The idea that phenomenography is not about describing phenomena but about describing people's conceptions (or awareness) of phenomena (p. 56) is grounded in a particular meaning being ascribed to the word phenomenon. Compare Marton's definition of phenomenon as the object as perceived, versus the noumenon referring to the object as is (p.72).

Trigwell, K. (1992) Qualitative differences in learning to teach materials. *Higher Education Research and Development*, 11(1): 85-93.

"This review of three books on teaching in higher education is presented, in part, as an analysis of the qualitative differences of the messages in those books" (p85). Trigwell represents Ramsden's Learning to Teach in Higher education as relational in its approach to teaching and learning (p86). This approach is associated with the approach to teaching and learning underpinning phenomenography: The first book (Ramsden) gives a comprehensive analysis of this conceptualisation of teaching, and then uses those concepts to discuss teaching and evaluation strategies (p86).

Trigwell, K. and Prosser, M. (1997) Towards an understanding of individual acts of teaching and learning. *Higher Education Research & Development*, 16(2): 241-256.

This article uses a phenomenographic perspective to interpret and integrate the results of relational research, including phenomenography in particular, in analysing the experience of teaching and learning in higher education. In this analysis the experience is conceived of as temporal and not extended over time. We describe conditions associated with two qualitatively different approaches to teaching which, as suggested by other research results, are associated with differences in the quality of student learning. Such an analysis can help explain the variation in the experience of the same lecturer in different teaching contexts or of different lecturers in the same teaching context.

Trigwell, K., & Prosser, M. (1996a) Changing approaches to teaching: a relational perspective. *Studies in Higher Education*, 21(3): 275-284.

Examined the conceptions of teaching and learning of a group of 24 lecturers in first-year college physics and chemistry in Australia, and how those conceptions related to their approaches to teaching. Strong relations were found between conceptions of teaching and approaches to teaching, though relations between conceptions of teaching and concepts of learning were not as strong.

Trigwell, K., & Prosser, M. (1996b) Congruence between intention and strategy in university science teachers' approaches to teaching. *Higher Education*, 32(1): 77-87.

An Australian study investigated the congruence between intention and strategy in science teachers' qualitatively different approaches to teaching in introductory courses. Results indicated that the strategy adopted by the teacher matched his teaching intention. As anticipated, a student-focused strategy was associated with a conceptual change intention, and a teacher-focused strategy was associated with an information transfer intention.

Trigwell, K. and Prosser, M. (1995) Using phenomenography in the design of programs for teachers in higher education. Paper presented to the 6th EARLI Conference, Nijmegen, The Netherlands, August 26 - 31.

This paper presents two cases of programs for teachers in higher education which show how phenomenographic ideas, and the results of phenomenographic research, can be built into their design. The activities are structured in terms of the examination of experience of the participants, students and lecturers. They also seek to help the participants see variation within the experience as a way of helping them examine their own experience and change their way of seeing teaching. These two aspects are important tenets of a phenomenographic approach to teaching and learning. The activities described refer to data collected and results of phenomenographic studies of teaching and learning. Staff are made aware of the results of the research through their own experience of analyzing the interview data. While the data have been carefully selected so that staff are more likely to 'see' what the researchers 'saw', it is argued that this approach draws on, and exemplifies, how phenomenography can be used in the design of programs for learning about higher education teaching. (Author's abstract).

Trigwell, K. and Prosser, M. (1991) Improving the quality of student learning: the influence of learning context and student approaches to learning on learning outcomes. *Higher Education*, 22(3): 251-266.

The studies reported in this paper focus on the relationship between qualitative differences in learning outcomes, perceptions of the learning environment and

approaches to study.

Trigwell, K., Prosser, M., & Lyons, F. (1997) Defining good teaching: relations between teachers' approaches to teaching and student learning. 7th EARLI Conference, August 26-30 1997, Athens.

Trigwell, K., Prosser, M. and Taylor, P. (1994) Qualitative differences in approaches to teaching first year university science. *Higher Education*, 27(1): 75-84.

Changing lecturers teaching strategies to improve learning in higher education may mean first having to address the intentions associated with those strategies. The study reported in this paper used a phenomenographic approach to explore the intentions associated with the teaching strategies of first year physical science lecturers. Approaches found ranged from those involving information transmission to those where the intention was to develop learning through conceptual change, but in all approaches, logical relations were found between intention and strategy. The implications for attempts to improve teaching through developing strategies are discussed. (Authors abstract). In terms of methodology the authors make the interesting comment that studies of intention should be restricted to areas with a minimum of variation (p.77).

Trigwell, K., Ramsden, P., Martin, E., & Prosser, M. (1995) Teaching approaches and the leadership environment. Higher education: blending tradition and technology: proceedings of the 1995 Annual Conference of the Higher Education Research and Development Society of Australasia (HERDSA), Rockhampton Qld.

Some results from the pilot testing of questionnaires to be used in a study of the relations between teaching approaches, the leadership environment and student learning, are reported in this paper. Inventories containing new teaching environment (including leadership) subscales, and previously reported teaching approach subscales were distributed to teachers in a small sample of large classes in Brisbane universities. Details of the development of the inventories, and the positive correlations found between a supportive leadership environment and student-focused approaches to teaching are discussed.

Tschudi, F. (1989) Do qualitative and quantitative methods require different approaches to validity? In S. Kvale (ed.) *Issues of Validity in Qualitative Research*. Studentlitteratur, Lund.

Uljens, M. (1993) The essence and existence of phenomenography. *Nordisk Pedagogik*, 13:134-147.

The phenomenographic approach is discussed with respect to its phenomenological features ... Hermeneutic phenomenography is proposed ...

Van den Berg, E., Katu, N. and Lunetta, V.N. (1994) The role of "experiments" in conceptual change: a teaching-experiment study of electric circuits. Annual Meeting of the National Association for Research in Science Teaching, March 26-29, 1994, Anaheim, CA.

This paper addresses the role experiments can play in concept development. The study used a qualitative phenomenography research methodology. The interactions of one student with an instructor in a series of eight sessions on electric circuits is reported. The first three sessions focused on diagnosing the students' prior conceptions of electric circuits. The remaining five sessions focused on teaching interventions designed to help the student develop more knowledge about circuits. Among the conclusions was that the hands-on science activities were effective in facilitating learning of correct relationships in circuits. However, the practical activities alone did not enable the subject to develop a fully scientific model of a circuit system.

Van Manen, M. (1990) *Researching Lived Experience*. New York: State University of New York Press.

A very accessible introductory text to the phenomenological research approach. Highly recommended.

Van Rossum, E.J. and Schenk, S. (1984) The relationship between learning conception, study strategy and learning outcome. *British Journal of Educational Psychology*, 54: 73-88.

This is a much cited paper as it establishes a relationship between learning approaches and outcomes. Also compares the work of Säljö and Marton with that of Biggs. Although Marton and Säljö approach the problem of describing learning outcomes differently, Van Rossum and Schenk conclude that the levels of outcome found by Marton and Säljö are similar to the first four levels of the SOLO taxonomy. One of the distinctive features of Marton's approach is of course that what (students) views look like and how they differ from one another is not to be determined in advance. (p74)

Velde, C. and Svensson, L. (1996) The conception of competence in relation to learning: process and change at work. Fourth Conference on learning and Research in Working Life, Steyr, Austria.

This paper considers the nature, character and meaning of competence, and proposes an alternative, holistic approach to competence which is more suited to workplace change, and theoretical knowledge about the learning process. The authors believe that there is little to be gained by continually rehearsing the shortcomings of the competence based training approach. Therefore a holistic, relational and interpretative model is put forth which continues to be characterised by flux and change.

Vermunt, J. D. (1996) Metacognitive, cognitive, and affective aspects of learning styles and strategies: a phenomenographic analysis. *Higher Education*, 31(1): 25-50.

Samples of freshmen from an open, distance-learning university (n=34) and a traditional university (n=20) were interviewed about their cognitive strategies, regulation of learning, mental models of learning, affective processes concerning learning, learning orientations, and perceptions of effectiveness of instructional approaches. Four qualitatively different learning styles were identified: undirected; reproduction-directed; meaning-directed; and application-directed.

Von Wright, J. (1992) Reflections on reflection. *Learning and Instruction*, 2(1): 59-68.

Paper presented at the European Conference on Learning and Instruction (4th, Turku, Finland, August 24-28, 1991). The development of reflective processes and the role of self-reflection in learning are examined. It is suggested that analysis of levels of conceptions or psychological processes through the phenomenographic method may clarify the development of metacognitive beliefs. Learning to use metacognitive knowledge and training reflective skills are considered.

Walsh, E. (1994) Phenomenographic analysis of interview transcripts. In J. BOWDEN and E. Walsh (eds.) *Phenomenographic Research: Variations in Method*. EQARD, RMIT.

This chapter addresses issues such as: ...the way in which categories of description are arrived at, the nature of the relationship between individual categories, the need for the group process rather than the individual to determine the set of categories from the data, and the role of research assistants and post-graduate students in the collection and analysis of data. (p 17)

Walsh, E., Bowden, J. and Dall Alba, G. (in press). Phenomenography: A contemporary approach to research in science education. Proceedings of the conference on Contemporary Approaches to Research in Mathematics and Science Education. Melbourne: Deakin University.

Phenomenography is a research approach which is used to describe the ways in which people experience the world around them, that is, to explore the qualitatively different ways in which people perceive, understand or conceptualize aspects of their experience. Originally, phenomenographic research arose from attempts in the early 1970s to provide more helpful insights into teaching and learning in the educational context.

This paper is concerned with an aspect of phenomenography which relates to the study of formal learning within particular content domains, for example, exploring students understanding of concepts and principles in physics. The discussion in the paper focusses on the methodology used in phenomenographic studies, with illustrations from the recent project "Measuring Student Understanding in Physics". (Author s abstract).

Walsh, E., Dall'Alba, G., Bowden, J., Martin, E., Marton, F., Masters, G., et al. (1993) Physics students' understanding of relative speed: a phenomenographic study. *Journal of Research in Science Teaching*, 30(9): 133-1148.

It is important that students of physics develop both quantitative and qualitative understanding of physical concepts and principles. Although accuracy and reliability in solving quantitative problems is necessary, a qualitative understanding is required in applying concepts and principles to new problems and in real life situations. If students are not able to understand what underlies quantitative problem solving procedures nor interpret the solution in physical terms, it is questionable whether they have developed an adequate understanding of physics. The research reported here is part of a larger phenomenographic study that is concerned with the assessment of physics students' understanding of some basic concepts and principles in kinematics. In this article students' understanding of the concept of relative speed is described. A variety of ways of understanding relative speed and of viewing a problem that dealt with this concept were uncovered. The results are used to suggest ways for teachers to proceed in assisting students to enhance their understanding of this concept. The teaching principles outlined concern both teaching relative speed, in particular, and teaching scientific concepts and principles, more generally.

Watkins, D.W. (1983) Depth of processing and the quality of learning outcomes. *Instructional Science*, 12: 49-58.

Early study based on Säljö and Marton s deep and surface learning distinctions. A parallel study to that conducted by Van Rossum and Schenk in that it establishes a connection between approaches to learning and learning outcomes. This study is not particularly sympathetic to qualitative research - but it does draw parallels between the outcomes of phenomenographic research and Biggs SOLO TAXONOMY. It is also quoted in other phenomenographic studies dealing with student learning.

Watts, M. and Ebbut, D. (1987) More than the sum of the parts: research methods in group interviewing. *British Educational Research Journal* 13 (25): 25-34.

...considers pros and cons of using group interviews in educational research

Wen, Q. and Marton, F. (1993) Chinese views on the relation between memorization and understanding. Paper presented at the 5th European Association for Research on Learning and Instruction Conference in Aix-en-Provence, August 31 - September 5.

This study is replicating of the previous study undertaken by Marton, Dall Allba and Tse (1992). One important purpose of this study is to find out whether the differences found by Marton et al. (1992) between Chinese teacher trainers and the Europeans do exist among the other Chinese people. The second purpose is to have an in-depth study of the Chinese conception of learning (p1).

West, L. (1988) Implications of recent research for improving secondary school science learning. In P. Ramsden (ed.) *Improving Learning: New Perspectives*. London: Kogan Page.

As part of this chapter West presents a case study of an action research project in which ten teachers collaborated to improve student learning across three grade levels and six subject areas. The rest of the chapter focuses on the need to change students conceptions of scientific phenomenon and some suggestions on how this can be achieved.

Willis, D. (1989) Encouraging and maintaining involvement in learning. Research and Future Development of Education in Australia: unpublished papers presented at the annual conference of the Australian Association for Research in Education held at the University of Adelaide 28 Nov - 2 Dec 1989. Adelaide: AARE, AARE.

Educational policy documents such as 'Learning for life' recently released in New Zealand incorporate assumptions about the value of continued learning. For such lifelong learning to take place, learners must possess the motivation and learning skills necessary to undertake further study. This paper examines the role involvement plays in the development of these skills and the positive attitudes of university students. Factors that are influential in the development of involvement in learning are also discussed. In the context of this paper, involvement is not only related to a deep approach to learning but also contains affective as well as cognitive elements and can be defined as a commitment expressed through active participation with a learning task. The paper is drawn from a larger longitudinal study directed at developing an understanding of the nature of involvement and its role in learning. The research has taken a largely phenomenographical approach in that student perceptions of involvement and individual experiences of learning form the basis of the study. The results reported here are drawn from interviews and open ended questionnaire responses made by 58 first and second year students attending Victoria University of Wellington. Each student was interviewed twice, twelve months apart, to enable information to be collected on involvement change as well as factors influential in its initial development. Results demonstrated that university students perceived involvement in qualitatively different ways which related to factors such as approach to learning, educational orientation to study (e.g. vocational or academic) and gender. So that while the definition given above has meaning for these students, perceptions of commitment and involvement behaviours differ between individuals. The major focus of the paper is on the interactive role personal and contextual factors play in the development of involvement. It is suggested that such factors combine to produce a particular learning climate that directly affects involvement in learning.

Zuber-Skerritt, O. (1986) The integration of university student learning skills in undergraduate programmes. In J. Bowden (ed.) *Student Learning: Research Into Practice - the Marysville Symposium*. CSHE, University of Melbourne.

Integration of phenomenographic research results into student learning in the Griffith University Modern Asian Studies programme.

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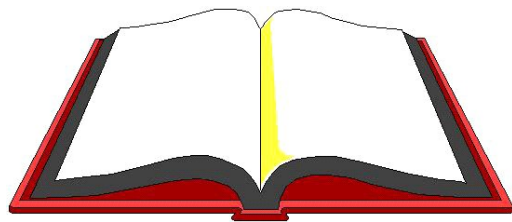
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Comments and requests associated with the occasional paper series should be addressed to:

Dr John Lidstone
Director
Centre for Applied Environmental and Social Education Research
Queensland University of Technology
Locked Bag 2
Red Hill, Brisbane Qld 4059
Australia

Telephone: +61-7-864 3289
Fax: +61-7-864 3986

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